77 00445

FINAL ENVIRONMENTAL IMPACT REPORT

for

Rio Bravo Ranch Specific Plan

Portion of Section 4, T29S, R29E
Kern River County Park Area

Prepared by:

Date: September 26, 1975

Kern County Planning Department
1103 Golden State Avenue
Bakersfield, California 93301

INTRODUCTION

Pursuant to the State EIR Guidelines implementing the California Environmental Quality Act of 1970, the following Final Environmental Impact Report (FEIR) is submitted.

The FEIR was prepared by the Kern County Planning Department by revising the Draft EIR circulated for agency review and by incorporating significant environmental comments throughout the EIR consultation process per Section 15146 of the State EIR Guidelines.

Review period for the Draft EIR was June 27, 1975, through September 10, 1975.

Lead Agency

Kern County Planning Commission

Applicant

Rio Bravo Development Company
George W. Nickel, Jr.
110 New Stine Road
Bakersfield, CA 93309

Applicant's Representative

Rickett, Ward & Delmarter
2901 H Street
Bakersfield, CA 93301
(805) 327-1486

TABLE OF CONTENTS

LIST OF MAPS

LIST OF GRAPHS AND CHARTS

LIST OF TABLES

SUMMARY

DESCRIPTION OF PROJECT

The proposed project is located in the vicinity of the Kern River County Park, near Lake Ming. It is north of and adjacent to Alfred Harrell Highway and on both sides of Lake Ming Road. Project area (128 acres) includes the existing Rio Bravo Tennis Club and consists of a proposed 200-unit condominium development and an 80-lot single-family residential subdivision. Specifics proposed include water from the Olcese Water District, sewage disposal by septic tank and leach line, surface drainage to Kern River and Lake Ming, private streets serving an ultimate 920 population, grading of a 60,000 to 80,000 cubic yards of earth, consumption of 263 acre-feet/year of water, disposal of 420 tons of solid waste per year, use of 1.4 million kilowatt-hours of electricity, and total cost of 14.7 million dollars.

DESCRIPTION OF ENVIRONMENTAL SETTING

The project site is located in the Sierra Nevada foothills six miles northeast of Bakersfield and four miles west of the mouth of the Kern River Canyon. The site is characterized by rolling hills and moderately eroded gullies that are covered with a variety of grasses. The project site is bordered by two county roads and bisected by another. Project is on gently inclined river terrace alluvium and may be crossed by an inferred fault, according to the Kern County Seismic Hazard Atlas. The climate is characteristically sunny, dry, and warm. Average growing season is 300 days. Severe freezes seldom occur, although winter day relative humidities are 40 to 50 percent. Santa Ana wind conditions become severe due to site's proximity to the Tehachapi Mountains. Groundwater beneath the site is 125 feet below surface. Wildlife consists primarily of small rodents and occasional predators (including coyote and kit fox), flocking type birds with occasional birds of prey, and few reptiles and amphibia. The site's aesthetics have been influenced by man-made development, including Kern River Golf Course and group picnic area, Lake Ming, Kern River County Park and Campground, and Rio Bravo Tennis Club, the latter of which projects intensive artificial illumination for evening tennis. The project site is located in the

southerly portion of the San Joaquin Valley Air Basin, while noise levels are affected by power boat racing activities on Lake Ming. The site is an average 15 miles and 18 minutes from various facilities in Bakersfield. The site is zoned R-1 and is shown on the Bakersfield Metropolitan Area General Plan as an open recreational and scenic area, while the Open Space Element of the Kern County General Plan shows it as urban influence. The site is 13 miles from the Sheriff's Department offices, 7.5 miles from the nearest fire station, about 9 miles from schools, and 8 minutes from ambulance service. An archaeological survey found no such materials at the site. The property presently has an assessed value of $79.99/acre, or $11,038.62 for the site.

ENVIRONMENTAL IMPACT OF THE PROPOSED ACTION

Natural visual components of the site will be reduced by grading of landscape to create building pads. Ambient temperatures may rise by 1.0° to 1.5° F, while relative humidity during winter could be decreased by two percent. Runoff increases are expected as is leachate from sewage disposal that will percolate to aquifers. All native vegetation will be removed, while adjacent native lands will be subject to intensive use and potential grass fires. Wildlife will be affected by construction and occupation of previously uninhabited land. The aesthetic quality of the land can be expected to be affected by construction of new residences, while the nearby campground will be impacted in terms of aesthetics and illumination. Air quality will be generally degraded by motor vehicle usage and dust. Increased traffic will require accelerated need for widening of roads and other improvements, while the accident potential and gasoline consumption will increase. Utility services will be increased, as will usage of adjacent recreational facilities. Schools will feel the impact of 360 additional full-time students. Development could generate a surplus county revenue of about $1,200,000.

MITIGATION MEASURES PROPOSED TO MINIMIZE THE IMPACT

Climate -- Design and orientation of structures and landscaping could reduce impacts.

Surface hydrology -- Lake intended for development should decrease peak runoffs and regulate overflow.

Soils -- Revegetation and erosion prevention per Public Works and Soil Conservation Service practices are needed.

Vegetation -- A 50'-100' buffer strip between development and natural areas planted with native materials will limit invasion by dominant species.

Wildlife -- Leash laws should be established to limit disturbance of off-site wildlife.

Aesthetics -- Plan layout, building materials, building height, orientation, and landscaping standards will reduce aesthetic impact.

Transportation -- Widening of county roads and proper control devices will reduce impacts

Utilities -- All utilities should be underground and in a single trench, if possible.

ALTERNATIVES TO THE PROPOSED ACTION

1. No project
2. Reduction of dwelling units
3. Alternate site layouts including denser clustering, all single-family residences, all condominiums
4. Alternate locations
5. Alternate visual layout
6. Alternate runoff methods
7. Alternate noise controls
8. Alternate zoning
9. Alternate energy sources
10. Alternate drainage methods

DRAFT ENVIRONMENTAL IMPACT REPORT

SECTION I. DESCRIPTION OF PROJECT

GENERAL AND LEGAL DESCRIPTION

The proposed project is located in the vicinity of the Kern River County Park near Lake Ming. It is north of and adjacent to Alfred Harrell Highway and on both sides of Lake Ming Road. It is south of and adjacent to the County of Kern campground and picnic grounds, Lake Ming, Kern River Golf Course and Group Picnic Grounds. These facilities lie south of and adjacent to the Kern River and are owned and operated by the County of Kern.

More precisely, the project is generally situated in the north half of the south half of Section 4, Township 29 South, Range 29 East, Mount Diablo Base and Meridian. See attached maps.

PROJECT OBJECTIVES

Project area includes the existing Rio Bravo Tennis Club and consists of a proposed 200-unit condominium development and an 80-lot single-family residential subdivision.

The development steps are as follows:

1. File specific plan on project area.
2. Change zones on the condominium site and the subdivision site from R-1 to R-1 P-D.
3. File tentative and final subdivision maps on both rezoned R-1 P-D sites.

REGIONAL MAP

RIO BRAVO SPECIFIC PLAN

DATE		FILE
6-6-75	KERN COUNTY PLANNING COMMISSION	
DRAWN BY fs	BAKERSFIELD CALIFORNIA	

4. Apply for conditional use permit(s) as necessary.

5. Obtain grading permits.

6. Apply for and receive waste discharge requirements from the Water Quality Control Board.

7. Other necessary actions.

It it intended that this environmental impact report will cover all phases, steps, and/or actions required to provide for complete development of the property as described herein.

PROJECT DESCRIPTION

a. The project consists of two units:

   1. The Condominium site, lying immediately west of the tennis club, is proposed to consist of two- and three-bedroom single- and two-story units in clusters of two, three, and four units. Improvements proposed include two lakes and streams with recirculation and aeration facilities, swimming pools and cabanas, and pedestrian trails. Access is proposed through the tennis club and would be controlled by a security gate; emergency exits would be provided.

   2. The Residential Subdivision proposed immediately east of the tennis club across Lake Ming Road would consist of approximately 80 estate sized lots of approximately 1/3 acre each, with homes being constructed under architectural design controls. Access to the subdivision would be via existing Lake Ming Road across from the entrance

to the tennis club and condominiums. Access to the subdivision is proposed to be controlled by a security gate; emergency exits are also proposed.

b. Specific improvements proposed are as follows:

1. Water Supply for the project is proposed by an extension of the existing Olcese Water District's water mains. The existing system consists of an intake structure at the Kern River and treatment facilities from which water is pumped to a storage tank where gravity service can be provided to the project.

2. Sewage Disposal is proposed by septic tank and leaching facilities under permits by the Kern County Health Department and the California Regional Water Quality Control Board. The tennis club's existing system consists of an 11,000-gallon septic tank and fifteen (15) seepage pits. A copy of the waste discharge requirements for that project is included in the appendix (page 33a). The condominium systems would consist of centralized septic tanks and leaching facilities. A design report for Phase 1 of the condominium system, prepared by Dr. John Timothy Winneberger, is included in the appendix of this report (page 69a).

3. Surface Drainage from the tennis ranch and the condominium unit is proposed to be collected in proposed retention lakes, with overflow passing down the westerly stream through the existing culvert under the county road bordering the westerly edge of the condominium site and eventually draining to the river. Drainage from the subdivision unit is proposed to follow existing channels, pass through the existing cul-

vert at Lake Ming Road, eventually draining to Lake Ming. Detention basins may be required by the Kern County Department of Public Works and/or the State Regional Water Quality Control Board.

4. The Streets in the condominium unit, as well as those in the subdivision, would be privately owned and maintained.

c. The approximate general acreage breakdown of the various uses is:

1. Condominium unit	
Building clusters (approximately 35)	
Building area	8 acres
Cluster site area	12 acres
Streets	4 acres
Lakes and waterways	3 acres
Landscaped slopes	10 acres
Landscaped areas	20 acres
Open space	10 acres
Subtotal - Condominium unit	67 acres
2. Subdivision unit	
Building sites	9 acres
Remaining lot area	33 acres
Streets	8 acres
Subtotal - Subdivision unit	50 acres
3. Undesignated (between County Road 711 and north boundary of condominiums)	11 acres
Total Specific Plan Area	128 acres

d. Estimated ultimate permanent population of the project is:

200 condominium units x 3 persons/unit	=	600
80 residential lots x 4 persons/unit	=	320
Total permanent population		920

Generally, condominiums are purchased by people with few children living at home. But, because of the present high cost of housing, a trend has been created toward purchase of condominiums by families with young children.

Studies in Southern California show that the average population of condominiums has been 2.7 persons per unit.[1] This represents families without children living at home or some with one child still living at home. In order to compensate for the trend, three persons/unit for the condominiums was used for this report.

It is estimated that the proposed subdivision lots will be purchased by families with an average of two children living at home, or four persons per residence.

e. Grading:

The developer proposes grading of the condominium unit to be designed to create level pads by cutting and filling for the building cluster areas. Fill slopes are proposed to be 3:1 or flatter. Grading would be according to the Kern County Grading Ordinance and controlled by engineering inspection and testing during construction. Fill and cut slopes will be protected against erosion according to standard engineering practices used in Kern County.

The estimated amount of earth to be moved is between 60,000 and 80,000 cubic yards. This estimate considers approximately 700 cubic yards of cut (or fill) per gross acre.

Maximum cuts are estimated between 10 to 15 feet, with the average maximum cut at approximately 8 feet. Maximum fill heights in a few locations may reach 30 feet, but fill slopes in the order of 10 feet to 20 feet high would be the general rule.

---

[1] Information from project proponent

Grading of the subdivision site is proposed mainly by cuts and fills for street construction and grading for building pads.

f. Street Standards:

Streets in the tennis club are 30 feet wide. It is contemplated that streets in the subdivision unit will be 36 feet wide and in the condominium unit 30 feet wide. Off-street parking in the condominium unit is proposed to be provided to compensate for the lack of on-street parking. Streets will be of all-weather construction consisting of asphalt concrete surfacing and aggregate base. Street drainage facilities to be provided include curbs and gutters, cross gutters, and culverts. Grades and layout are to conform to county standards. Minimum radii of curvature are proposed to be 200 feet with a maximum grade of 10 percent.

g. Water Consumption:

It is estimated that the ultimate water consumption, after full development, will be as follows:

		Gallons/Day
Condominium unit		
200 units x 3 people x 100[1] gpcpd		60,000
Irrigation - 30 acres x 3 ft/year		80,000
Lakes and waterways - 3 acres x 10 ft/year		26,800
Subtotal		166,800
Subdivision unit		
80 lots x 4 people x 100 gpcpd		32,000
Irrigation - 1/4 acre/lot x 3 ft/year		54,000
Swimming pools[2]		30
Subtotal		86,030
Total estimated ultimate water use		252,830
	=	.76 AF/Day
	=	284 AF/Year

Note: gpcpd = gallons per capita per day

---

[1] Kern County Health Department

[2] Estimation using 2/3 residences having 450 square-foot pools; evaporation = 3.75 feet/year; slosh = 1/25 foot/year

h. Solid Waste:

In 1974, the average production of solid waste was 2.3 pounds per capita per day. It is estimated that this will increase to 2.5 pounds per capita per day by 1980.[1] Using this figure and a population of 920 permanent residents, the solid waste production of the ultimate project is estimated to be 420 tons per year.

i. Energy:

Assuming an all-electric development and using 5,000 kilowatt hours (kwhrs)/year/residential unit,[2] it is estimated that the breakdown of consumption would be[3] 1.4 million kwhrs per year.

j. Schedule of Development

The initial phase (tennis club) is now complete. The remaining facilities are proposed to be completed in phases according to the following schedule:

Unit	Estimated Completion
Tennis lodge	Fall, 1975
Restaurant	Fall, 1975 - Spring, 1976
1st phase - Condominium unit	Spring, 1976
Subdivision unit (grading and service system)	Summer, 1976
2nd phase - Condominium unit	1977
3rd phase - Condominium unit	1978

[1] Source: Kern County Public Works Department

[2 and 3] Source: Pacific Gas and Electric Company

k. Economic Considerations:

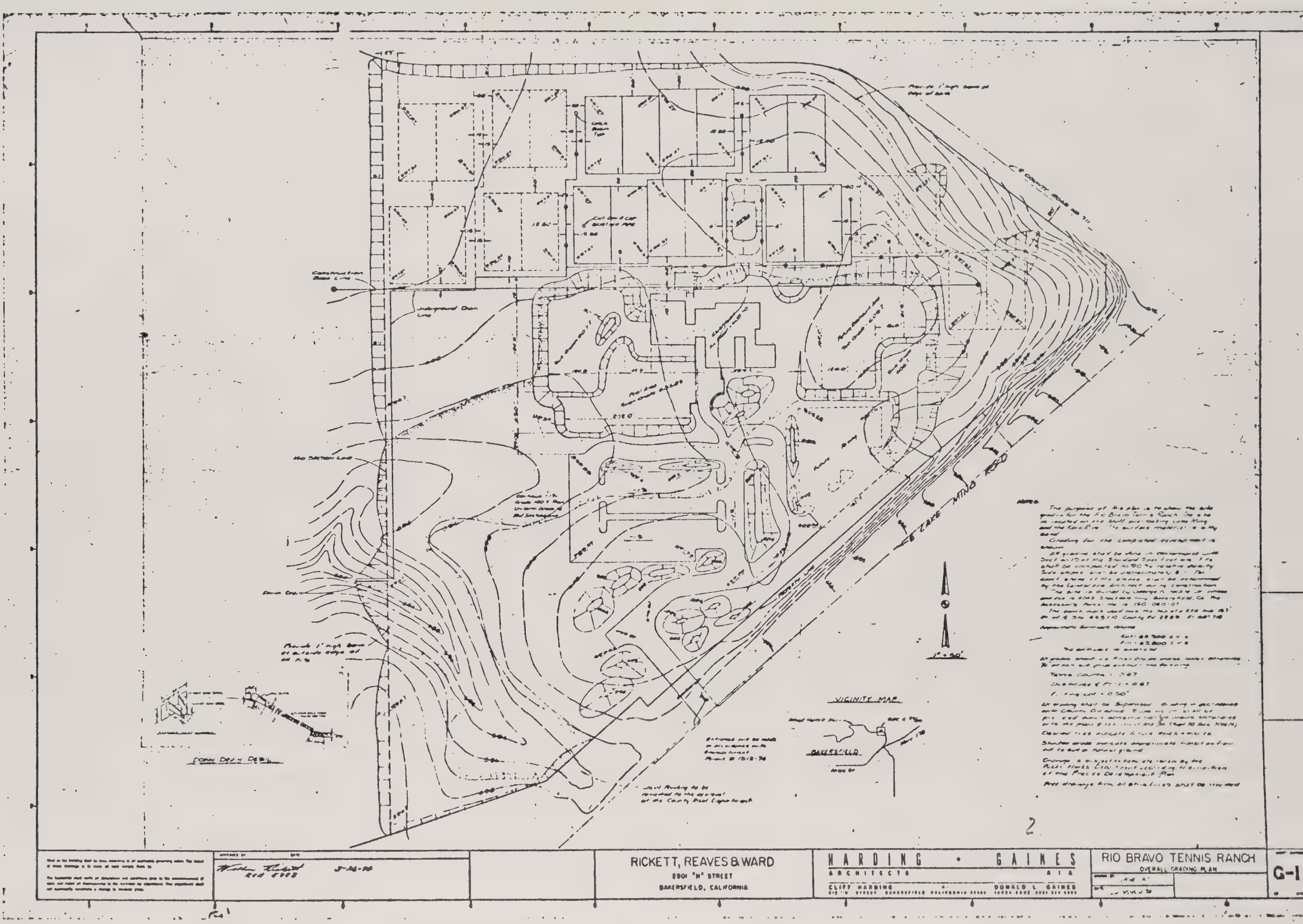
The capital cost summary for the Rio Bravo development is shown in Table I. This summary includes interest during construction.

TABLE I

CAPITAL COST SUMMARY
HOUSING FACILITIES*

Account Title	Subdivision (80 units)	1st Phase Condominiums (42 units)	2nd Phase Condominiums (93 units)	3rd Phase Condominiums (65 units)	Total
Housing structures	$ 3,428,400	$ 1,800,000	$ 3,985,794	$ 2,785,770	$11,999,964
Sewage disposal	120,000	63,000	139,500	97,500	420,000
Landscaping	86,000	44,900	99,500	96,600	300,000
Streets, sidewalks, curbs, and gutters	135,700	31,500	69,800	48,800	285,800
Community service conduits					
a. Gas	20,100	5,300	11,700	8,200	45,300
b. Electricity	36,800	9,700	21,500	15,000	83,000
c. Water	5,600	23,100	51,200	35,700	115,600
d. Telephone	--	--	--	--	--
Engineering and construction management	194,000	98,900	218,900	153,000	664,800
Other costs, including contingency, environmental studies, sales taxes, and transportation	116,500	59,300	131,400	91,800	399,000
Interest during construction	116,500	59,300	131,400	91,800	399,000
Total cost	$ 4,259,600	$ 2,195,000	$ 4,860,694	$ 3,397,170	$14,712,464
Cost/housing unit	$ 53,245	$ 52,262	$ 52,266	$ 52,264	

* Applicant's submittal


VICINITY MAP
BAKERSFIELD
2
RICKETT, REAVES & WARD
2901 "H" STREET
BAKERSFIELD, CALIFORNIA
HARDING • GAINES
ARCHITECTS A I A
CLIFF HARDING
DONALD L. GAINES
RIO BRAVO TENNIS RANCH
OVERALL GRADING PLAN
G-1

RIO BRAVO
CONDOMINIUMS

TOTAL PROPOSED DEVELOPMENT — 108 UNITS

Cluster development – initial phase

Future phases

Key plan

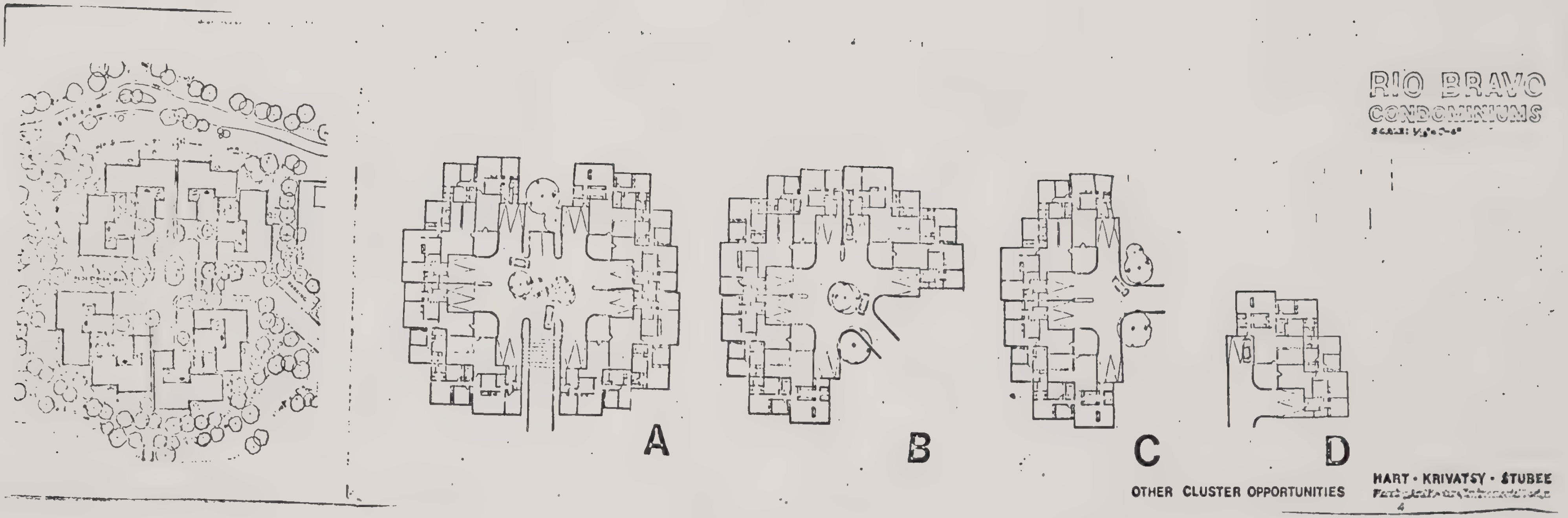
HART · KRIVATSY · STUBEE
Planning, Architecture, Environmental Design

RICKETT · WARD · DELMARTER
Civil Engineers & Surveyors

3

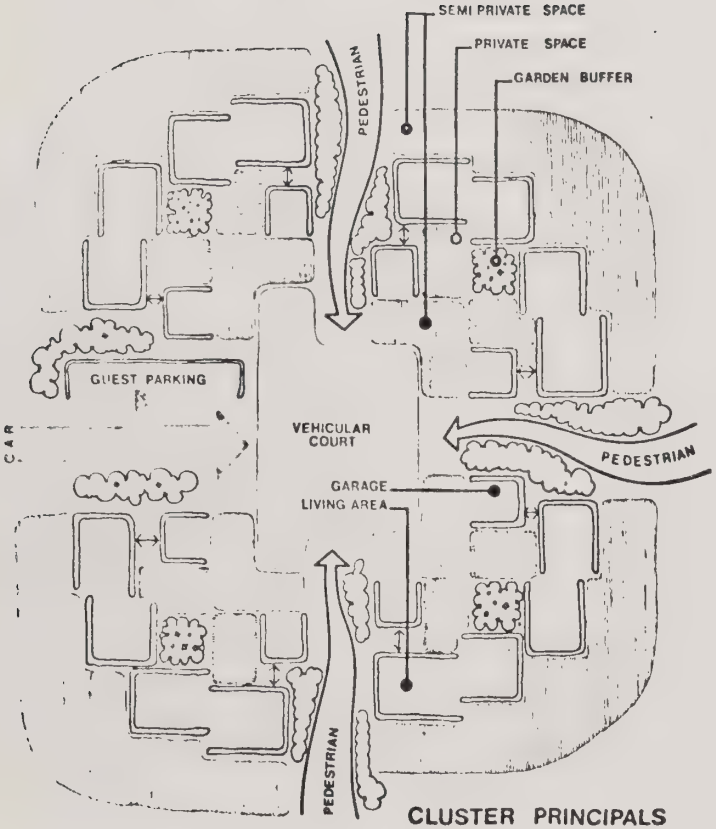
SCHEMATIC GRADING PLAN OF CONDOMINIUMS

4 3a

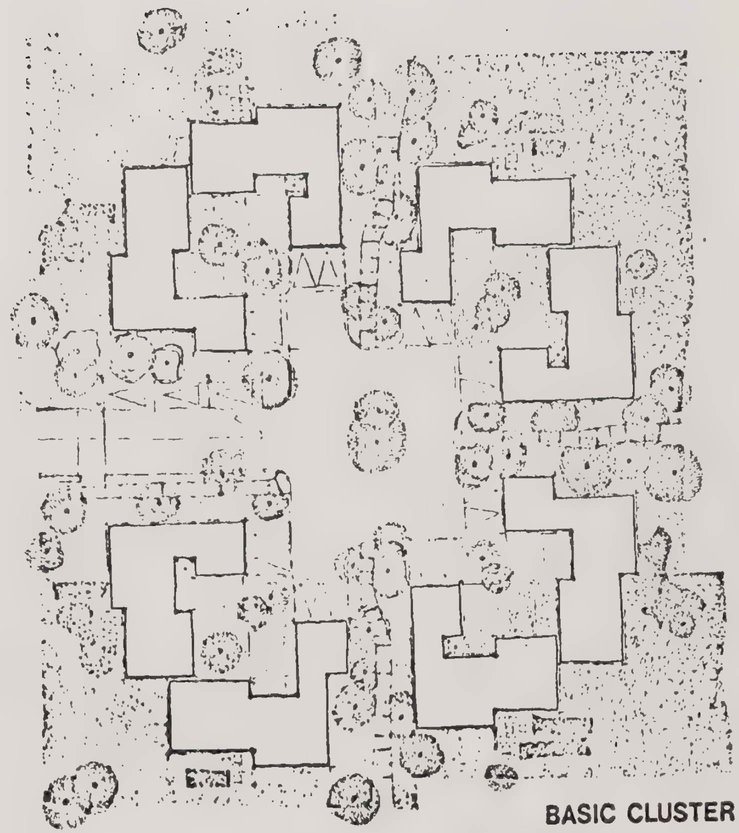

RIO BRAVO
CONDOMINIUMS
A
B
C
D
OTHER CLUSTER OPPORTUNITIES
HART · KRIVATSY · STUBEE

RIO BRAVO CONDOMINIUMS

SCALE: 1/16" = 1'-0"



CLUSTER PRINCIPALS



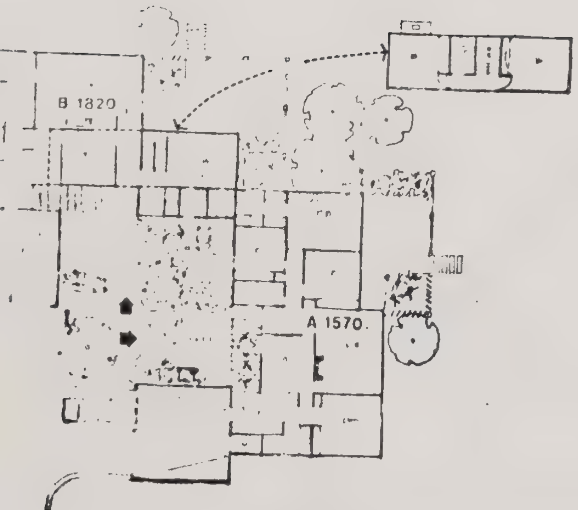
BASIC CLUSTER

HART · KRIVATSY · STUBEE

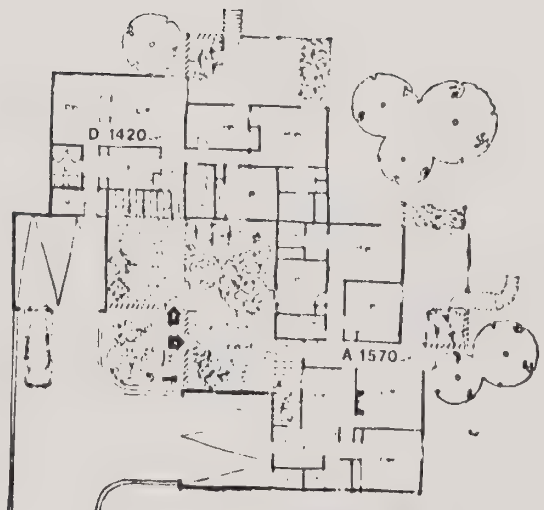
Planning, Architecture, Environmental Design

RIO BRAVO CONDOMINIUMS

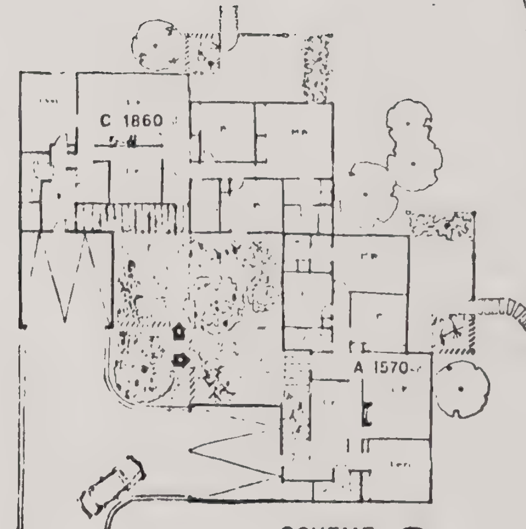
SCALE: 1/8" = 1'-0"



SCHEME 1
3 Bedrm. A
B



SCHEME 2
3 Bedrm. A
3 Bedrm. D



SCHEME 3
3 Bedrm. A
C

HART · [illegible] · [illegible]

[illegible]


SCHEMATIC GRADING PLAN
SUBDIVISION
LEGEND
CUT
FILL
NOTE: EACH LOT WILL HAVE A GRADED BUILDING SITE
(NOT SHOWN)
SCALE
0
200

SECTION II. DESCRIPTION OF ENVIRONMENTAL SETTING

VISUAL

The project site is located in the Sierra Nevada foothills approximately six miles northeasterly from the urban development of Bakersfield and about four miles westerly from the mouth of the Kern River Canyon. The site is characterized by rolling type hills and moderately eroded gullies that are covered with a variety of grasses (see vegetation section for types). The verdant quality of the flora is quite dependent on the amounts and timing of rainfall. Winter and early spring seasons normally find a greening of the vegetation, while other times of the year will yield an ochre or brown tinted landscape.

The project site is bordered by two county roads. The southerly-most route, Alfred Harrell Highway, consists of two lanes of pavement on a freeway right-of-way. This alignment is fairly level and characterized by long, sweeping horizons and vertical curves. This type of road design is typical of freeway patterns with large areas of cut and fill slopes that were originally left barren following road construction. More recently, flora indigenous to the area has begun to vegetate these slopes, giving a more uniform visual appearance to the road right-of-way as it relates to the natural terrain.

Old Alfred Harrell Highway borders the project site on the north and exists as a two-lane road on a 60-foot right-of-way. This road meanders through the Kern River County Park area, while its design, with abrupt horizontal and vertical curves, gives the appearance that the road evolved along a path of "least resistance" through the natural terrain. Vegetative growth along this alignment gives the visual appearance of a road that was developed to blend in with the landscape.

The visual environment of the project site is enhanced by the existence of the Kern River within 1/4 mile of the site, while the foothills and the Sierra Nevada provide a distant and far distant view. Lake Ming, an 84-acre man-made body of water, also contributes to the visual experience. Much of the natural vegetation that exists along the Kern River provides a sylvan area through a land of ochre-brown hills and bluffs. Man has modified this natural environment with the park-like development in the project area (see aesthetics).

A total park-like visual appearance of the area is occasionally interrupted by man-made structures and objects. (See aesthetics for further discussion.)

TOPOGRAPHY

Proposed project is situated on gently inclined river terrace alluvium. To the north and 1/4 mile from the project is the Kern River, which has incised in an entrenched meander[1] course. Locally, incised gullies up to 50 feet deep intermittently drain runoff into the Kern River. Mean elevation of the project area is about 600 feet MSL[2]; Kern River, 500 feet MSL; hills 1,000 feet south of project area ascend to 900 feet MSL. North of Kern River, rolling mountainous terrain rises to the most prominent feature, Round Mountain, 1,612 feet MSL.

GEOLOGY

Harry R. Feder, Engineering Geologist, submitted an engineering geology report for the proposed project on December 31, 1973. The report is included in the appendix of this EIR (page 134a). Excerpts from Feder's report follow:

---

[1] Entrenched meander - An incisement cut by a rejuvenated stream, the meandering course having been acquired in a former cycle

[2] MSL - Above mean sea level

"Surface faulting does not appear to be present in the surface terrace alluvium in which the property is located, although subsurface faults are located both east and west thereof.[1]

"Terrace alluvium averaging about ~~150~~ [55*] feet in thickness on the property appears to be adequately permeable for construction of a leaching field for disposal of waste water.

"Underlying the terrace alluvium of the property is impermeable Round Mountain silt.

"Stratigraphy - The subject property is located in the southeast portion of the San Joaquin Tertiary depositional basin. The local area contains about 4,000 feet of Tertiary Sediments overlying the granite-metamorphic basement complex. Basement is exposed in the Sierra Nevada Range four miles east of the property on the east side of the Kern Gorge Fault, which has a vertical displacement of about 4,000 feet. The lithologic units at the subject property are as follows:

Alluvium	~~155'~~ [50'-60'*] maximum
Round Mountain silt	~~700'~~ [800'*]
Nozu-Olcese sands	1,175'
Freeman-Jewett silt	1,050'
Pyramid Hill-Vedder sands	500'
Walker formation basement	300' +

"Quaternary - Recent alluvium as differentiated from terrace deposits, is distributed along the Kern River and in gully channels. Terrace deposits consist of coarse, medium and fine clastics including boulder, sand and silt sized rock material, generally fairly well rounded, mostly poorly sorted and unconsolidated.

"Structure - The property is located on a shallow, southwesterly dipping, faulted homocline as shown by surface geology, Exhibit I,[2] and structural contours on top of the first sands, the Nozu-Olcese, Plate 2.[2] The principal fault in the area located 1,500 feet west of the property is the northeasterly striking Tarabino (Barker Ranch) fault having a displacement of 450 feet down on the east on the top of the first sands. The

---

1 It should be noted that the map and description of the project's geologic situation does not concur with the Kern County Seismic Hazard Atlas in the general area of the site. Referring the reader to the accompanying "Seismic Hazard and Topography" map, it can be seen that the inferred fault depicted, which traverses the site, does not coincide with the map submitted with the engineering geology report.

2 See Appendix for Exhibits and Plates.

* These values have been changed to reflect recent data received from applicant's representative. See page 120.

north-northwesterly striking Round Mountain fault[1] system with a displacement of 400 feet down on the east at Round Mountain oil field may continue southerly to the east of the property where displacement may be about 100 feet on the top of the first sands.[1] Other faulting is probably present at depth within and in the vicinity of the property as indicated by contours which may only be partially the result of an irregular top of the Nozu-Olcese.

"Surface Geology - Detailed surface mapping was done in about five square miles for this report. The Tarabino fault is located north of the Kern River in surface exposures of Olcese sand in fault contact with Round Mountain silt. South, minor displacement is mapped in poor exposures of the Mon Bluff formation. The Round Mountain fault[1] similarly displaces Olcese and Round Mountain silt north of the River and appears to displace the Mon Bluff formation, about 50 feet.

"Faulting does not appear to affect either terraces or the alluvium of the Kern River."

Note: Other discussion of minor faults in the area is omitted from this summary.

Refer to the appendix for the entire text (page 134a).

"Seismicity - The subject property is located in a seismically active area as shown by pre- and post-1952 earthquake epicenters, Plates 3 and 4,[2] and by published and unpublished mapping.[3] 1952 earthquake epicenters, having a Richter magnitude of 6.1, are located six miles southwest and ten miles east-southeast of the property. About 30 additional epicenters are located within a 10 mile radius of the property. It is assumed for this report that the area continues to be seismically active and additional epicenters are located within a 10 mile radius of the property."

Note: Other discussion of seismic risk potentials is omitted from this summary.

Refer to the appendix for the entire text (page 134a).

"Other Hazards - Minor slumping is mapped at the west end of the property on the oversteepened east wall of the gully. Soil creep is noted south of the property on and immediately north of the steep slope. This does not affect the property. Subsidence of soils and formational units appears to present no unusual problems on the property. This conclusion and other conclusions in this report reflect geologic conditions prior to construction including earthwork and are subject to change as additional information is obtained."

---

1 This is the fault which is inferred and continues on the same strike underneath the proposed project site as depicted by the <u>Kern County Seismic Hazard Atlas</u>.

2 See Appendix for Exhibits and Plates.

3 See accompanying "Earthquake Epicenters. Clay Soil. Shallow Water. Selected Faults" map taken from the <u>Kern County Seismic Hazards Atlas</u>.

ROCK TYPES:

Younger Sediments (Pleistocene and younger) — Ys
Older Sediments (Pliocene and Older) — Os
Crystalline Rocks (Igneous and Metamorphic) — Cr

ROCK STRUCTURE:

Zone of Faulting
Surface Faulting
Faults Showing Creep
Faults that displace Younger Sediments or show other evidence of recent movement
Surface Faults Inferred - exact location unknown
Subsurface Faults
Subsurface Faults Inferred - exact location unknown
Contacts other than Fault Contacts
Observed
Inferred
Uncertain Contacts — ?

SENSE of FAULTS:

Relative movement of fault

Up — U 700 — VERTICAL DISPLACEMENT IN FEET
Down — D

Right — FAULT 500 — HORIZONTAL DISPLACEMENT IN FEET
Left — 300 FAULT

Dip angle — FAULT 60 — DIP ANGLE IN DEGREES

FOLDS:

Anticline normal / overturned
Syncline normal / overturned
Dip Strike normal (30 — ANGLE IN DEGREES) / overturned (20) / vertical

Concealed or subsurface folds are shown as

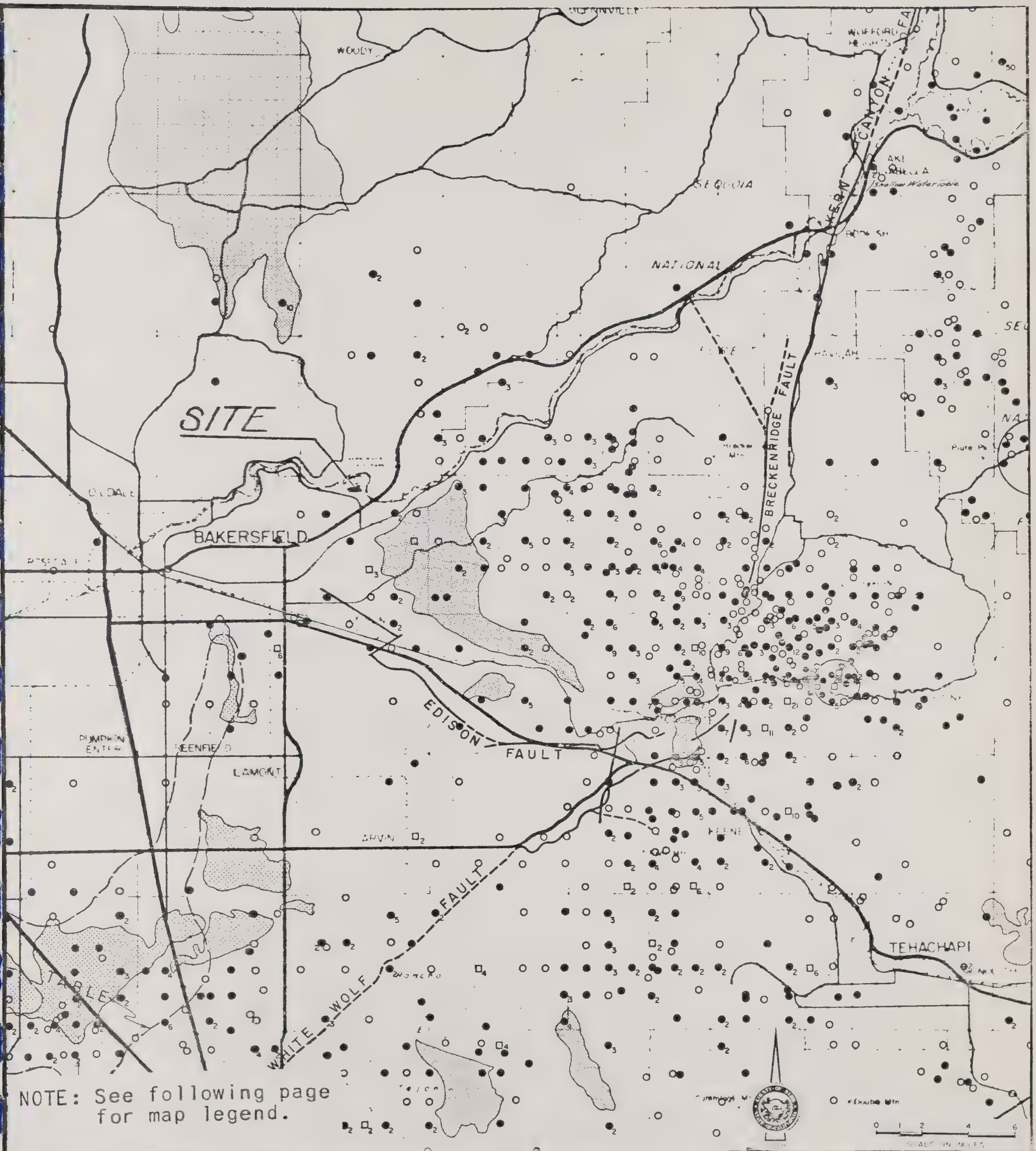
LANDSLIDE:

EARTHQUAKE EPICENTERS:

SEISMICITY AND STRAIN RELEASE: When two or more earthquakes have occured at the same average location (epicenter) one symbol representing the sum of the individual strain releases during these earthquakes is shown on this map with a subscript number equal to the number of quakes at that location during the years for which the data are available (1932 - 1971). (Example: Strain release sum = 96.14, number of quakes = 5, value from N_3 table = 5.2, symbol is $-\oplus_5$).

SYMBOL	RICHTER MAGNITUDE
○	2.9 or less
	3.0 to 3.9
	4.0 to 4.9
⊕	5.0 to 5.9
	6.0 to 6.9
	7.0 or greater.

SOURCE: DIV OIL & GAS VOL. 33 NO. 2 (1947); SURFACE DATA- MAP NO. 3
REFER TO THE TEXT OF THE SEISMIC SAFETY ELEMENT FOR EXPLANATION OF TERMS.



EARTHQUAKE EPICENTERS · CLAY SOIL
SHALLOW WATER · SELECTED FAULTS

DATE 4-22-75	KERN COUNTY PLANNING COMMISSION	FILE RIO BRAVO
DRAWN BY Krause	BAKERSFIELD CALIFORNIA	EIR

SOURCE: CALIFORNIA INSTITUTE OF TECHNOLOGY SEISMOLOGICAL LABORATORY
(COMPUTER PRINTOUT, 1932 - 1971)
U.S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE

BEING SUPPLEMENTARY DATA TO THE

SEISMIC SAFETY ELEMENT

MAP PREPARED BY THE KERN COUNTY PLANNING DEPARTMENT
IN COORDINATION WITH THE KERN COUNTY COUNCIL OF GOVERNMENTS

LEGEND:

SYMBOL	RICHTER MAGNITUDE
○	2.9 OR LESS
●	3.0 TO 4.9
□	5.0 TO 6.9
■	7.0 OR GREATER

○ HIGH MAGNITUDE CENTER OF EPICENTER CLUSTERS

CLAY SOIL (group 3 soils)

STEEP SLOPE - CLAY SOIL (group 7 soils)

SHALLOW WATER TABLE - 5' to 15'

FAULTS

SEISMICITY AND STRAIN RELEASE

WHEN TWO OR MORE EARTHQUAKES HAVE OCCURED AT THE SAME AVERAGE LOCATION (EPICENTER) ONE SYMBOL REPRESENTING THE SUM OF THE INDIVIDUAL STRAIN RELEASES DURING THESE EARTHQUAKES IS SHOWN ON THIS MAP WITH A SUBSCRIPT NUMBER EQUAL TO THE NUMBER OF QUAKES AT THAT LOCATION DURING THE YEARS FOR WHICH THE DATA ARE AVAILABLE (1932-1971).

EXAMPLE:
STRAIN RELEASE SUM - 96.14
NUMBER OF QUAKES - 5
VALUE FROM N_3 TABLE - 5.2
SYMBOL - $\square_5$.

HARRY R. FEDER
ENGINEERING GEOLOGIST

O BRAVO TENNIS RANCH
N COUNTY CALIFORNIA

SURFACE GEOLOGY

DEC. 31, 1973

Legend

Qal	Alluvium		Jointing
Qt_{1-4}	Terraces		Core Hole
Pkr	Kern River Fm.		Water Well
Mmb	Mon Bluff Fm.		Wildcat Well
Mrm	Round Mtn. Silt		Drill Depth Base Alluvium
Moi	Olcese Sand		

GENERAL CLIMATE

In very general terms, the overall climate of the Lake Ming area is characteristically sunny, dry, and warm.

Ninety percent of all precipitation falls during the six months from November through April, inclusive. Snow in the area is infrequent, with only a trace occurring in about one year out of five.

Summers are relatively cloudless, hot, and dry. Low humidity, however, makes summers more pleasant.

The average growing season for the area is about 300 days. This area of the county, climatically speaking, is particularly suitable for a number of specialized crops, such as cotton, potatoes, oranges, and grapes.

Winters are mild and semi-arid, yet fairly humid at times. December, January, and February are characterized by both radiation and high-inversion fogs or low stratus clouds, mostly nocturnal. These fogs prevail when moist air is trapped in the Southern San Joaquin Valley by a high pressure system. In extreme cases, high-inversion fog may persist for two to three weeks. Its depth is usually less than 300 meters (about 1,000 feet).

Severe freezes seldom occur at the project area due to mountain-valley wind systems.

There are no agricultural crops grown in the immediate area due to the lack of water supply. Existing Kern River water has been adjudicated for various uses.

Relative humidities approach 100 percent during winter nights. Winter day relative humidities usually are 40 to 50 percent if fog does not persist. It appears that because of man's inadvertent weather modification through atmospheric pollution and increasing agricultural irrigation in the San Joaquin Valley, absolute humidities are tending to be higher through time.

During the warmer months, absolute humidities are usually low, but they appear to be on the increase due to man's involvement through the years. Also, mean dew point temperatures are increasing. The past 45 years of data observed at the local U. S. Weather Bureau station reflect this. Evaporation rates are high because of the cloudless summers and generally low humidities. Annual evaporation totals exceeding 100 centimeters (40 inches) from a water-free surface are typical of the area.

Winds are generally light to moderate, their direction usually from the north-northwest. Santa Ana wind conditions from the southeast (general direction of Tehachapi Mountains) become severe at times during the fall and spring months. The project site experiences the "full force" of these winds (up to 65 miles per hour) because of its proximity to the Tehachapi Mountains. By the time winds reach Meadows Field and are officially measured, they have slowed considerably. Therefore, severe southeast wind data measured at Meadows Field do not depict the true conditions of the site. Prevailing wind velocities on site cannot be determined by incorporating Meadows Field data, either.

North-northwest winds, as at Meadows Field, prevail. However, their speeds are usually greater due to site being at the foot of hills which are just north of Lake Ming. Topographic effects upon wind in the area have the same effect upon precipitation patterns. When storms move across the area from the north, the

hills discussed above create a "mini" rainshadow over the area, and rainfall is considerably less than might be expected. However, when storms track the other way or are "compacted" against the mountains to the east, durations of heavy rainfall create a sheet flow runoff which can cause natural drainage channels to sometimes become double their original size in a very short time. Also, during spring and late summer, thunderstorms frequent the area and allow considerably more rain to fall than amounts recorded at Meadows Field. At times during heavy thunderstorm activity at the site, one can drive west into Bakersfield to find the streets dry and the sun shining.

Visibility (in a climatological sense) from the Lake Ming area is usually better than from points farther west. This is especially true during stagnant periods when haze and dust sometimes reduce visibility to less than two miles in Bakersfield, and at the same time the air can be very clean and visibility unlimited at the site.

QUANTITATIVE CLIMATONOMY

As discussed above, some elements which make up the site's climate are not correlated very well with Meadows Field or other official observation sites. However, to give the reader a general picture of the general climate in the site's region, the following tables and isopleth maps are presented.

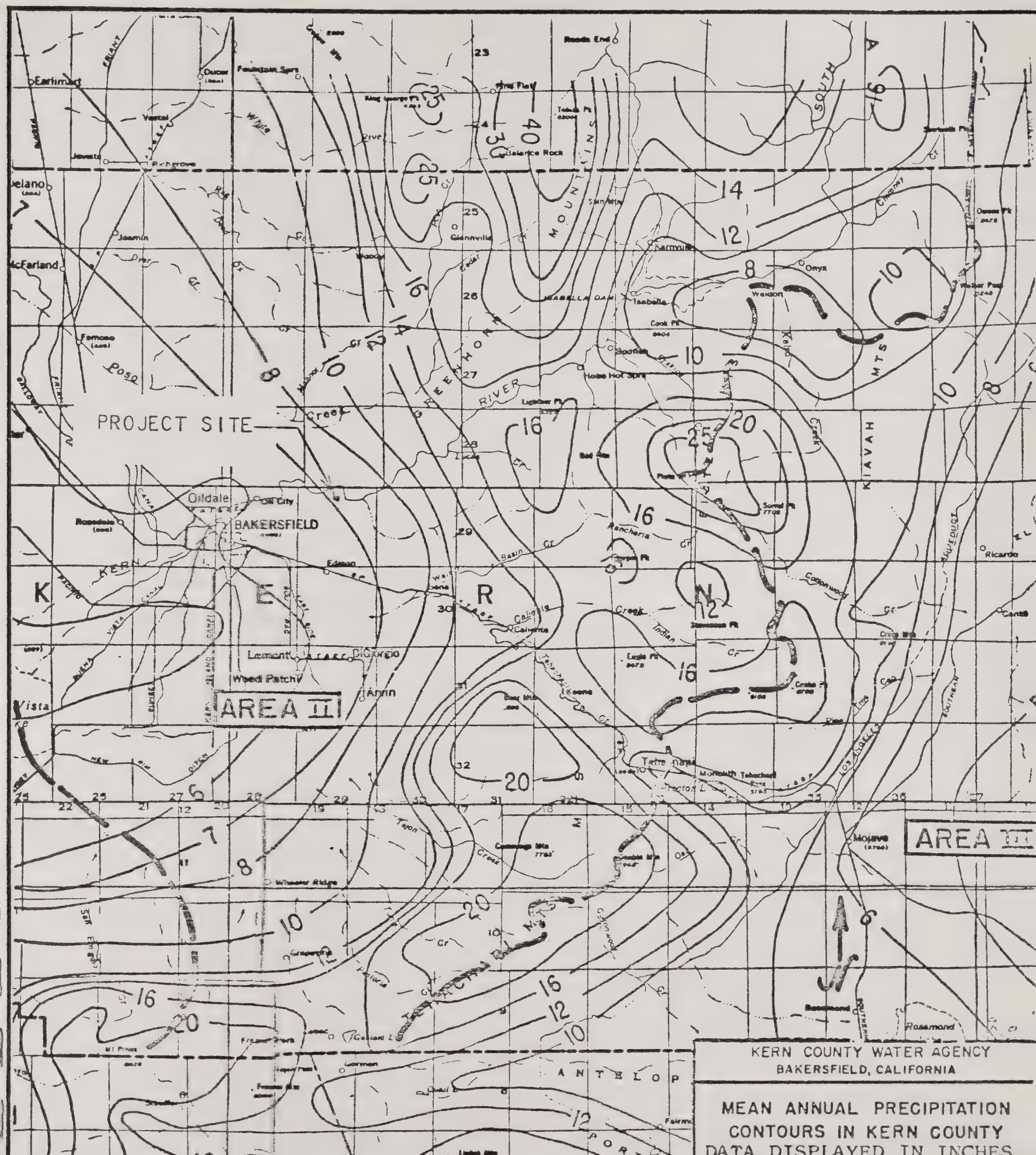
TABLE II

CLIMATE DATA
BAKERSFIELD, CALIFORNIA
MEADOWS FIELD

Station Location: Lat. 35°35'N, Long. 119°03'W
Station Elevation: 145.5 meters (475 feet) MSL
Data Source: U. S. Department of Commerce, Environmental Science Services Administration, Environmental Data Services, NOAA

Month	Mean Temperature in ° Centigrade (1)	Mean Precipitation in Centimeters (2)	Mean Evaporation in Centimeters (2, 3, & 4)	Computed Potential Evapotranspiration in Centimeters (2) (Penman Method)
J	8.57	2.97	2.81	1.79
F	11.11	2.90	4.32	4.57
M	13.83	2.69	7.98	9.40
A	17.22	2.06	10.56	11.78
M	21.33	0.56	14.88	17.02
J	26.06	0.23	17.07	18.29
J	29.06	0.03	17.25	20.32
A	27.61	0.00	15.06	18.54
S	24.72	0.20	10.88	13.46
O	19.33	0.81	7.48	9.14
N	13.28	1.24	3.82	4.32
D	9.33	2.46	2.21	2.27
Annual	18.39	16.15	114.32	130.80

NOTE: (1) °F = (1.8 x °C) + 32
(2) Inches = Centimeters/2.54
(3) California Department of Water Resources, Arvin-Frick Station Data - Section 8, T31S, R29E, MDB&M - Elevation = 134 meters
(4) Class "A" Evaporation Pan Data Times Pan Coefficient of 0.70



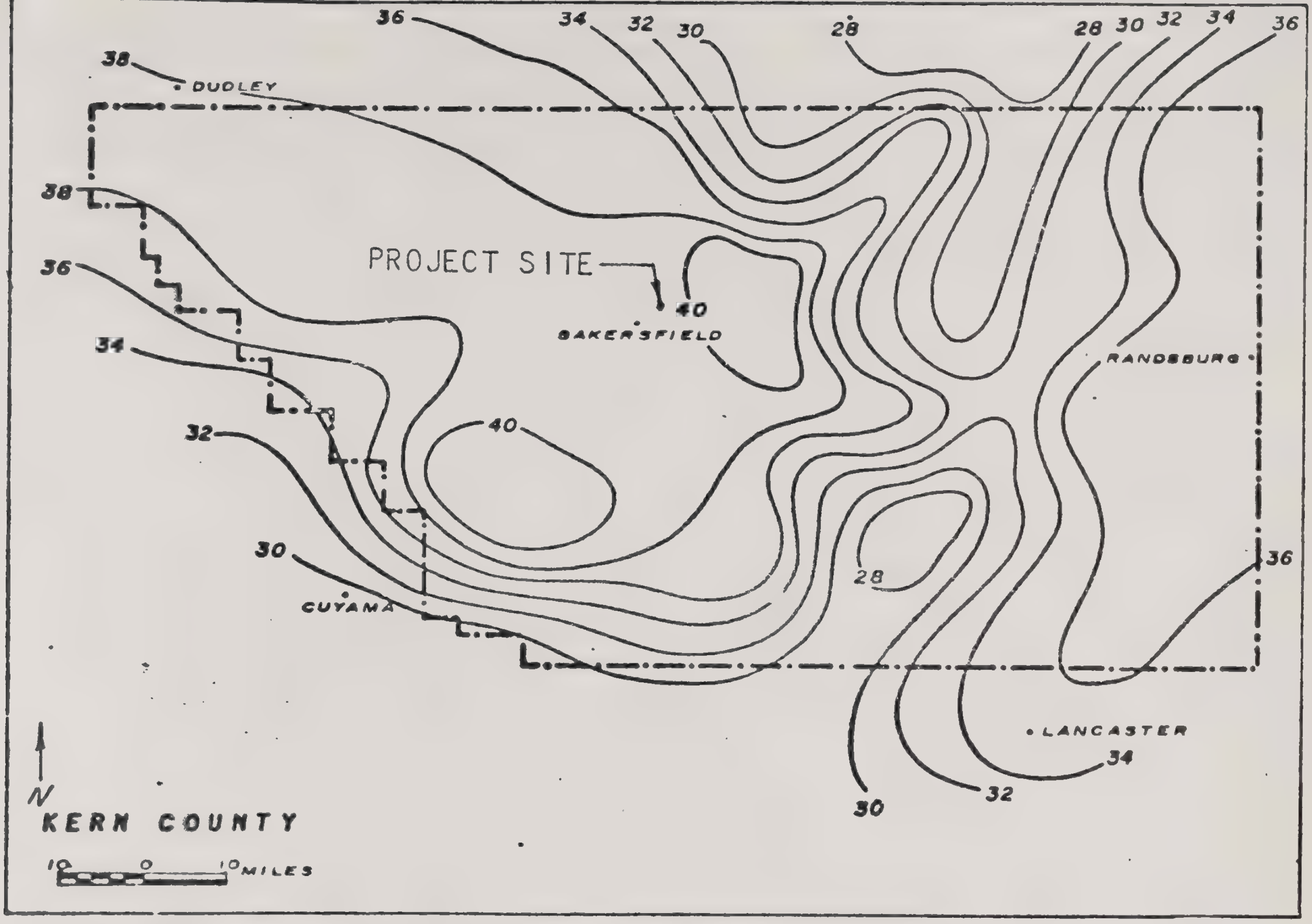
DATE

DRAWN BY

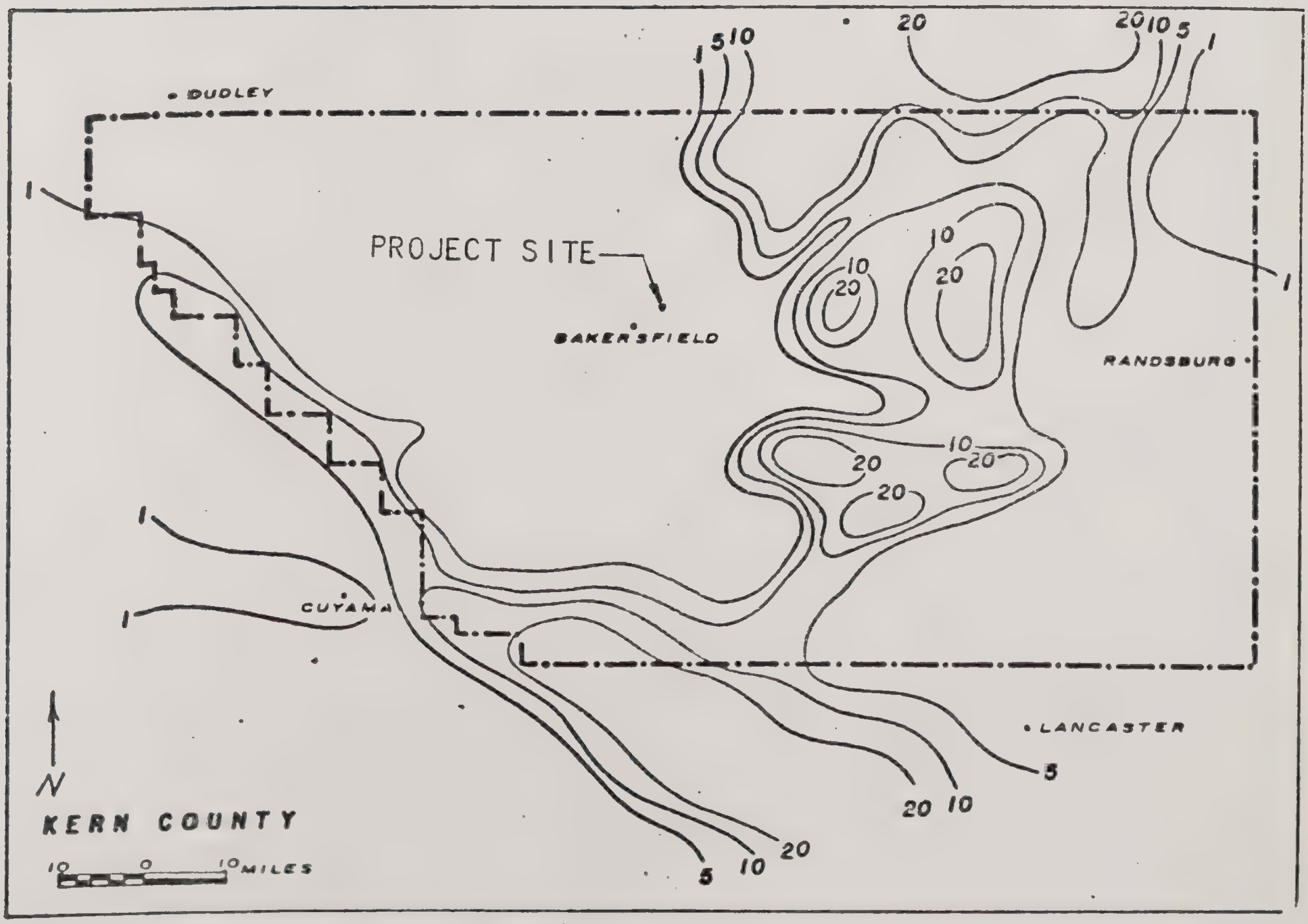
KERN COUNTY PLANNING COMMISSION

BAKERSFIELD CALIFORNIA

FILE

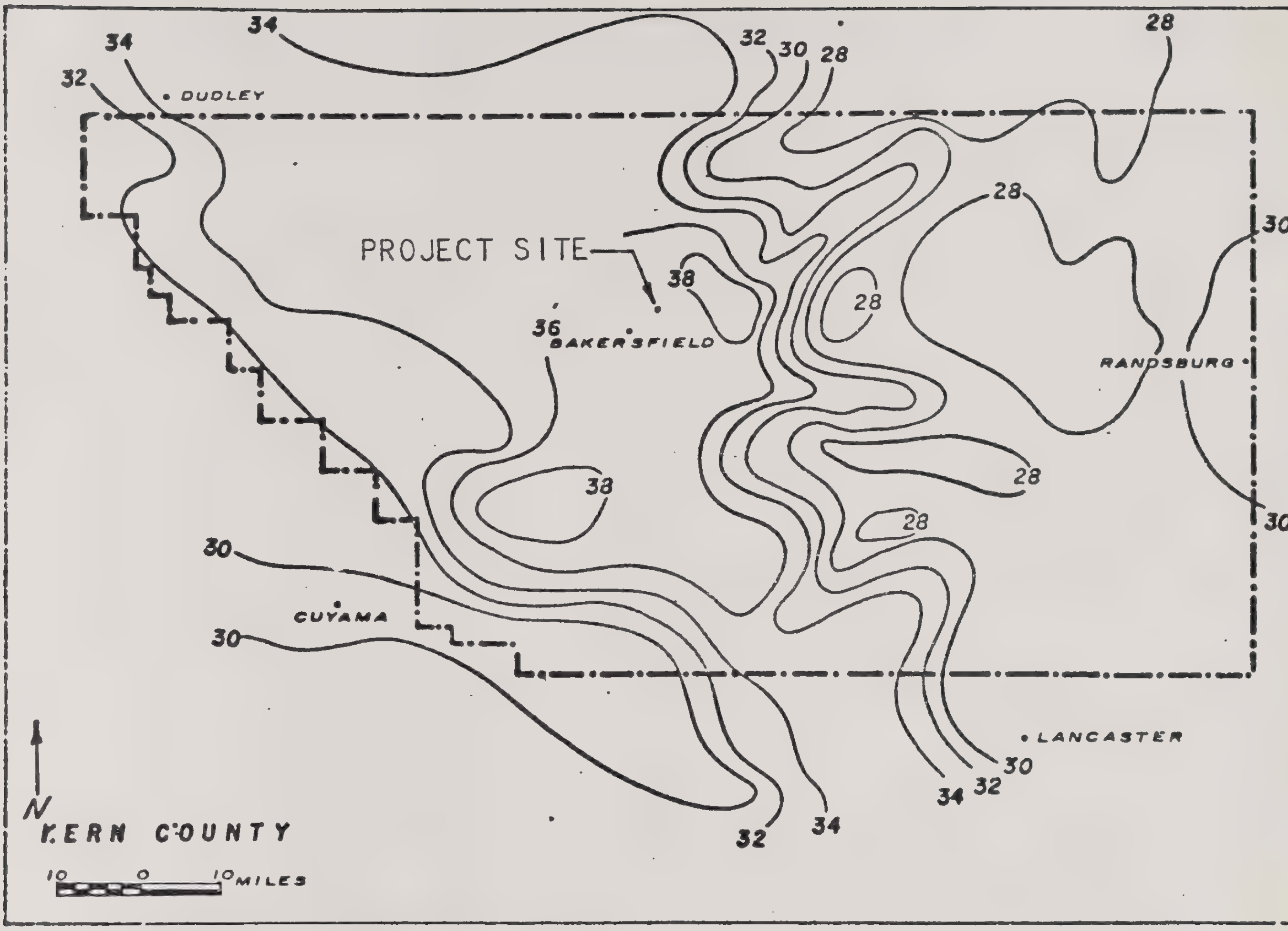


Average Annual Potential Evapotranspiration (Inches).

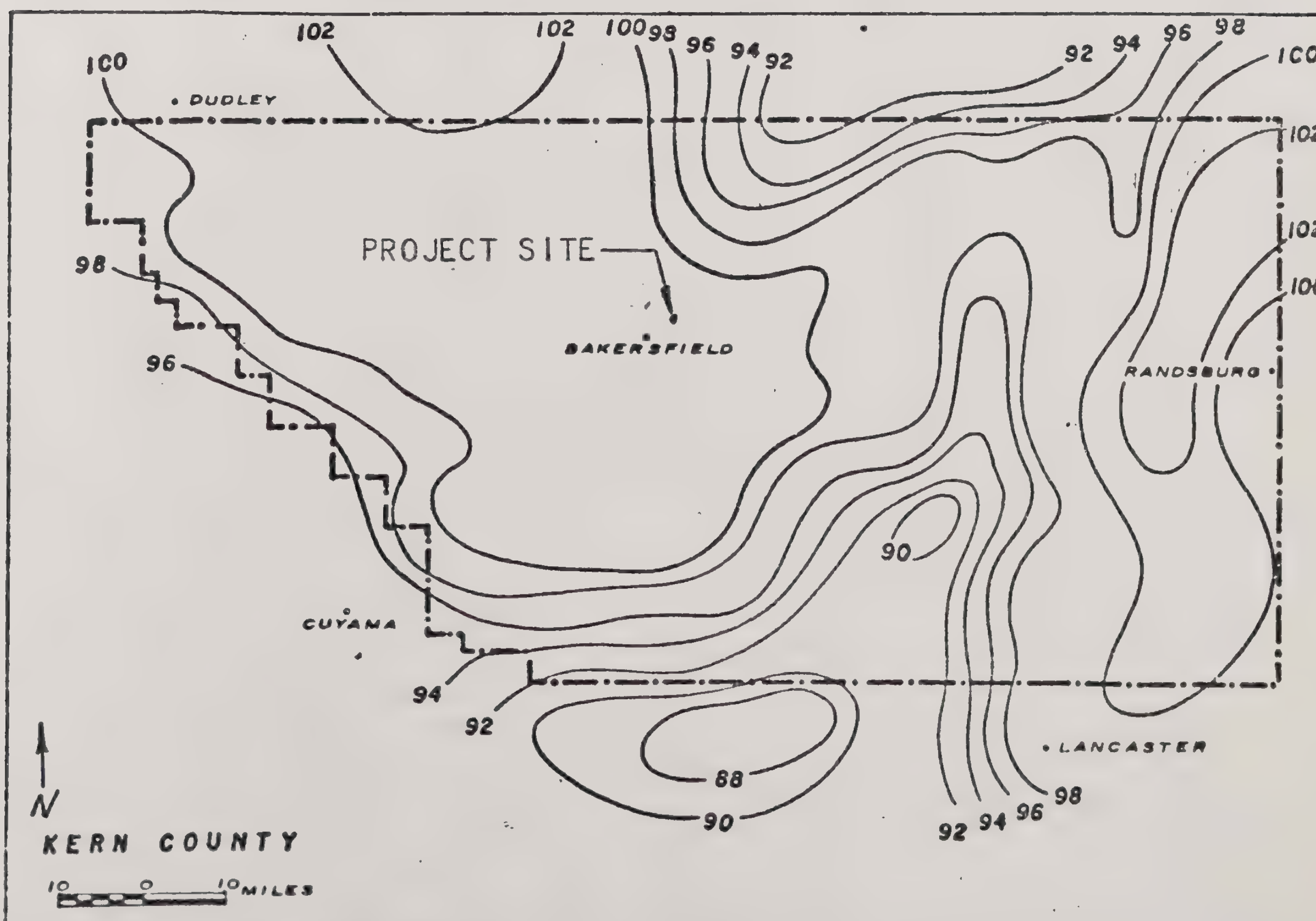


Average Seasonal Snowfall (Inches).

SOURCE: UNITED STATES WEATHER BUREAU, 1964

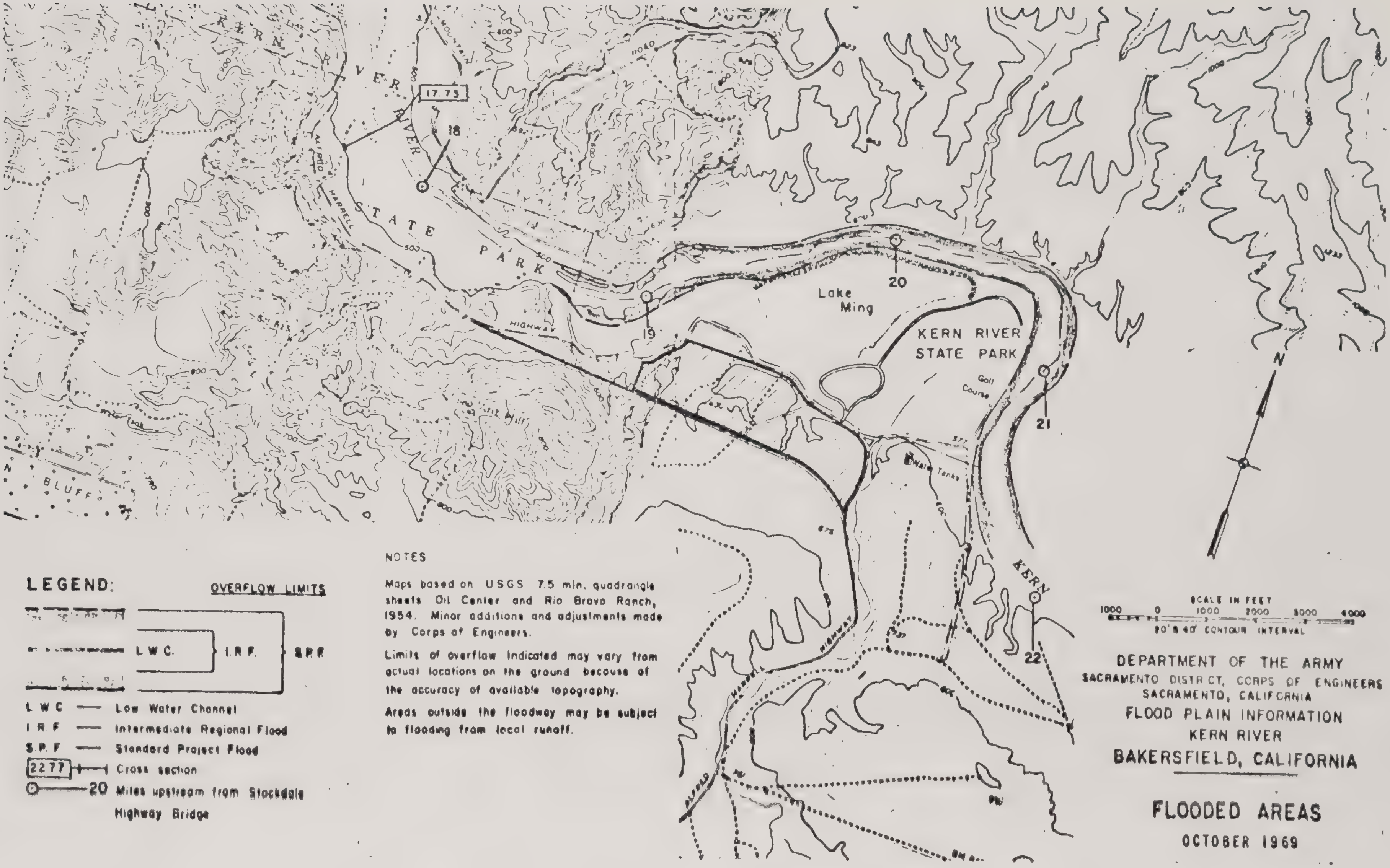


January Mean Minimum Temperature (°F).



July Mean Maximum Temperature (°F).

SOURCE: UNITED STATES WEATHER BUREAU, 1964



LEGEND:

OVERFLOW LIMITS

L.W.C. — I.R.F. — S.P.F.

L.W.C. — Low Water Channel

I.R.F. — Intermediate Regional Flood

S.P.F. — Standard Project Flood

2277 — Cross section

20 — Miles upstream from Stockdale Highway Bridge

NOTES

Maps based on USGS 7.5 min. quadrangle sheets Oil Center and Rio Bravo Ranch, 1954. Minor additions and adjustments made by Corps of Engineers.

Limits of overflow indicated may vary from actual locations on the ground because of the accuracy of available topography.

Areas outside the floodway may be subject to flooding from local runoff.

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA
FLOOD PLAIN INFORMATION
KERN RIVER
BAKERSFIELD, CALIFORNIA

FLOODED AREAS

OCTOBER 1969

SURFACE HYDROLOGY

Kern River is the principal surface water in the project area. Mr. Harry Feder reports in his engineering geology report that "a small volume (?) spring at the contact of terrace alluvium with Round Mountain silt is present near the south one-quarter corner of Section 3," T29S, R29E, MDB&M.

Kern River flow, as measured at First Point by Tenneco, Inc., since the construction of Isabella Dam, follows:

TABLE III

KERN RIVER - ANNUAL FLOW AT FIRST POINT
IN THOUSAND ACRE-FEET*

Calendar Year	Flow
1953	548.8
1954	528.4
1955	444.3
1956	840.9
1957	444.3
1958	1104.7
1959	258.0
1960	300.0
1961	177.8
1962	697.6
1963	801.4
1964	339.2
1965	720.4
1966	678.5
1967	1396.2
1968	453.9
1969	2461.3**
1970	589.5
1971	427.5
1972	268.5
1973	979.6
1974	818.6
	Mean = 694.5
	N = 22 years

* Source: J. Manning, PhD, Professor of Earth Sciences, Cal State College Bakersfield

** 1969 had the highest recorded flow at First Point. Records date back to 1894.

GROUNDWATER

Since initial study of proposed project, the question of groundwater occurrence beneath site has gone unanswered. Proposed project does not plan to employ site's groundwater (if there is any). The problem with not knowing exactly where groundwater level is generates questions about water quality degradation by proposed liquid waste disposal methods. It would appear, now that tentative conclusions[1] have been reached (see Kern County Health Department's comments to Draft EIR), that groundwater may not occur until 700+ feet below site. However, this does not rule out the possibility of septic effluent's percolating into only the upper 50 to 55 feet of alluvium, creating a groundwater mound beneath project. Thus, water of questionable quality may reach Lake Ming and/or Kern River.

The following graph, "Kern River - Annual Flow at First Point," shows (circles) flow for each calendar year from 1899 to 1974. A five-year mean[2] (line) is shown. A normal line is also shown, which is given as 682,000 acre-feet per year.

Lake Ming, constructed in 1957, is approximately 600 feet north of proposed project site. It has a surface area of approximately 84 acres[3] and a volume of about 210 acre-feet (using a mean depth of 2.5 feet). Lake Ming, primarily, is a limited use recreation lake with the sole purpose of catering to power boat and water ski enthusiasts.

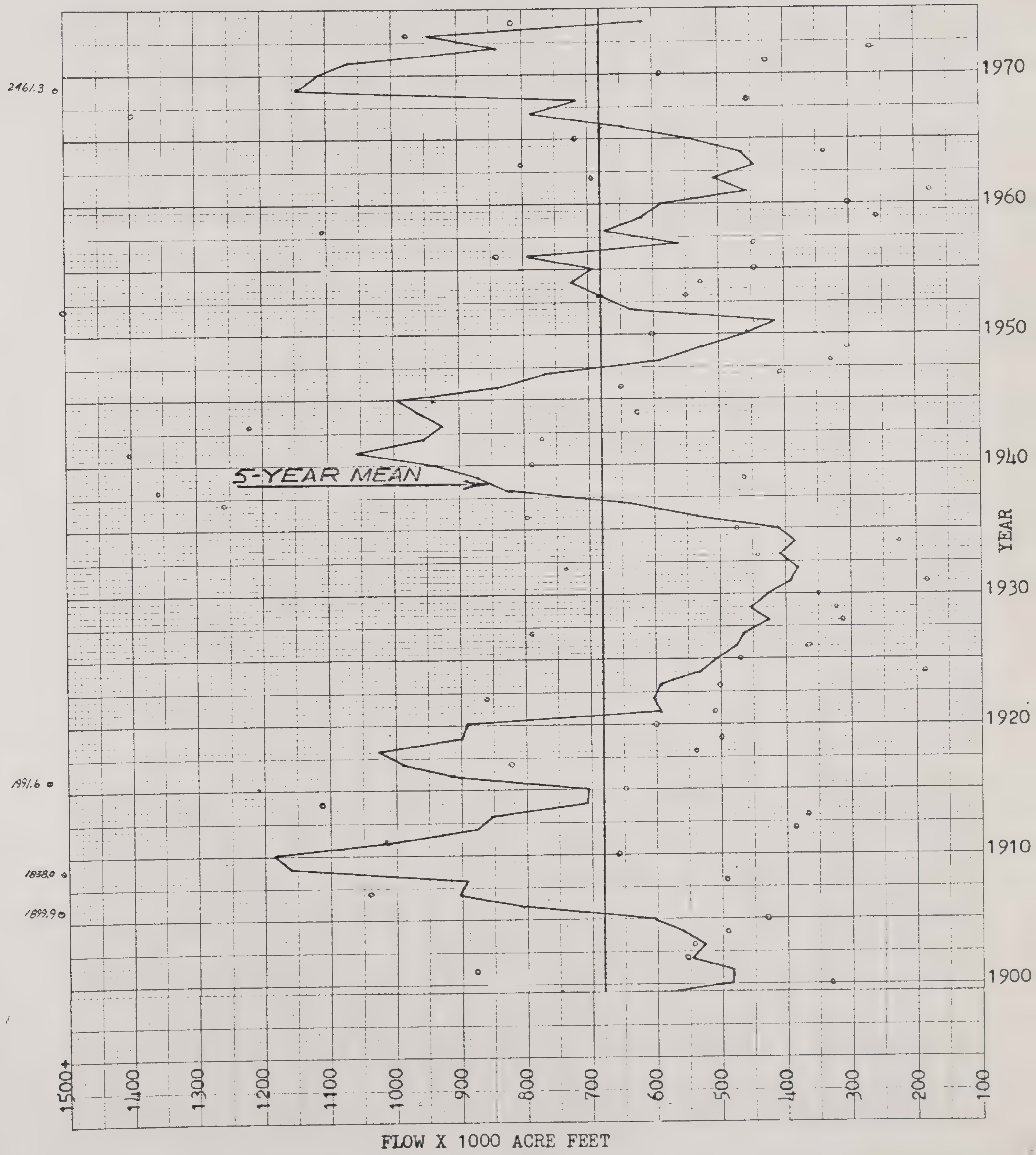
---

1 Recent test holes drilled during June, 1975, were dry. If alluvium contains no unconfined or perched groundwater, the water table beneath project site may be below Round Mountain silt (700 feet thick).

2 Five-year mean - The value for any year given as the mean of that year and the previous four years.

3 Source: Kern County Public Works Department, Environmental Section

KERN RIVER - ANNUAL FLOW @ FIRST POINT



SOILS

U. S. Department of Agriculture, Soil Conservation Service Report and Map of Kern County, dated September, 1967, indicates two soil classifications on proposed project site (see following soils map). Soils on site are type Cd-Td except approximately 29 acres at the westerly portion of project site which are of type $\frac{\text{Df-Cs}}{\text{C-2}}$. Seven acres at the extreme westerly area are not included in improvement plans for proposed project.

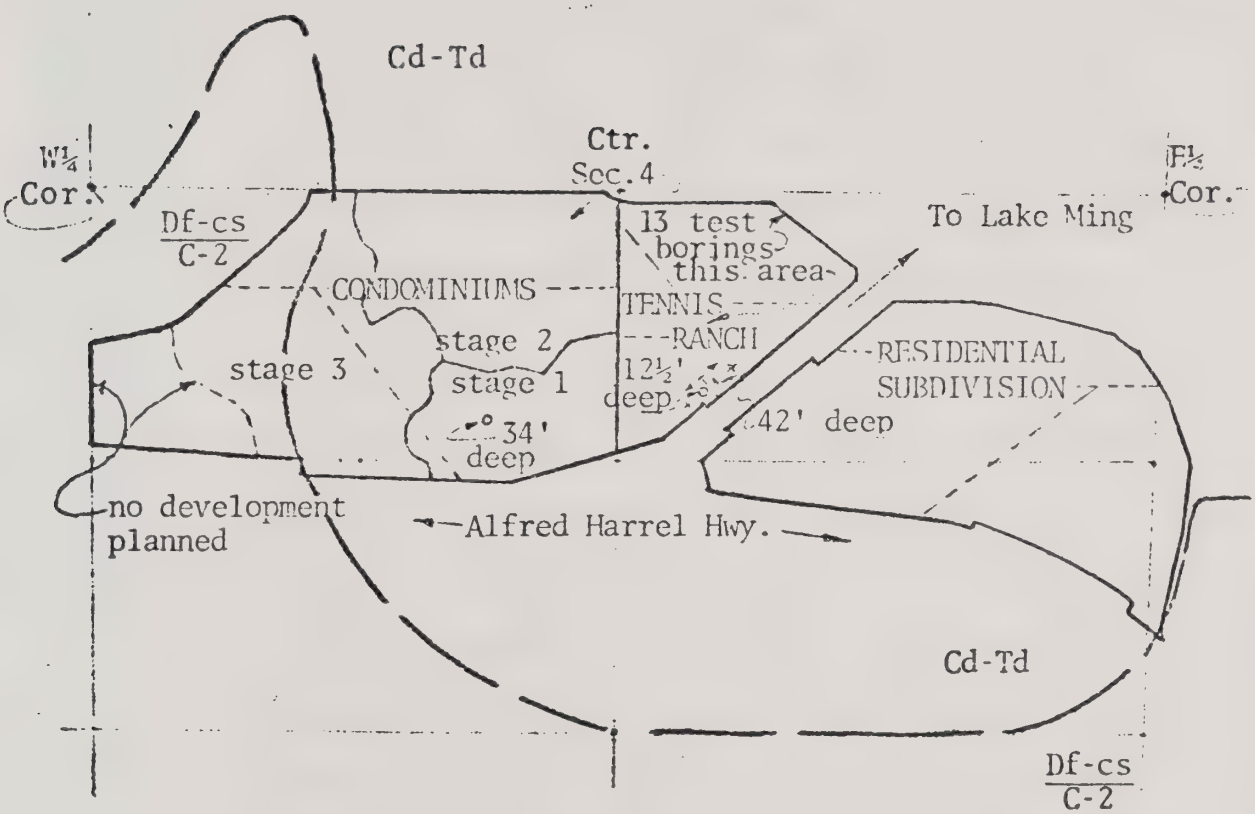
Cd-Td soils are of the Cajon-Tujunga association. This association consists of somewhat excessively drained coarse-textured soils developed from granitic alluvium. Cajon soils comprise about 75 percent and Tujunga soils about 20 percent of the association. Inclusions of Hesperia soils usually embody remaining 5 percent.

Cajon soils possess light brownish-gray, single grain, sand surface soils and light brownish-gray, massive, stratified coarse and medium sand subsoils. Reaction is moderately alkaline and calcareous in surface and subsoils.

Tujunga soils retain grayish-brown, single grain, loamy sand surface soils and grayish-brown, single grain, stratified loamy coarse sand and loamy sand subsoils. Reaction is neutral in the surface and subsurface horizons. Soils of this association retain stratified granitic alluvial material substrata. Limitations which should be considered when this soil association is employed for urban purposes are: Allowable soil pressure limitation is severe. Limitations for untreated steel pipe and shrink-swell behavior are low. Limitation for septic tank filter field is slight. Permeability of this association is rapid (thus, generation of water mound from septic effluent beneath property

RIO BRAVO TENNIS RANCH PROPERTY

MAP OF SOIL TYPES, PROPOSED USE AND TEST LOCATIONS



SECTION 4, T.29 S., R.29 E., MDM

LEGEND:

- Property Lines
- Soil Type Boundaries
- Interior Divisions
- Section & Sub-section Lines
- Access
- Borings
- Percolation Tests

Scale: 1"=1,000'

SOILS MAP SUBMITTED BY APPLICANTS REPRESETATIVE

can result). Spacing of septic tank filter field and well for water supply must be such as to avoid mixing of landscape percolation with septic effluent.

$\frac{\text{Df-Cs}}{\text{C-2}}$ soils are of the Delano-Cuyama Association, 5 to 9 percent slopes, eroded. This association consists of well-drained, moderately fine-textured soils developed on old alluvial fans from mixed rock sources. Delano soils make up about 45 percent and Cuyama soils about 40 percent of the association. Hesperia soils and coarse-textured soils comprise about 15 percent.

Delano soils have brown, blocky, loam surface soils and yellowish-brown, blocky, sandy clay loam subsoils. Cuyama soils have yellowish-brown coarse sand or gravelly sand substrata. The soils are moderately alkaline in reaction and are calcareous throughout. Erosion rills are common. In urban use of the association, moderate erosion hazards from water exist. Limitations for allowable soil pressure shrink-swell behavior, septic tank filter fields, and untreated steel pipe are moderate. See appendix for complete soil analysis of proposed project submitted by applicant's representative (page 176a).

VEGETATION

Vegetational habitat type is essentially valley grassland and consists of native Californian species of both plants and animals, as well as those non-native forms that have been introduced into this part of the state in connection with the livestock industry. Some of the nonnative plants are valuable in cattle production in this part of the state. Such grasses as red brome grass, *Bromus rubens*, and wild oat, *Avena fatua*, as well as the early growing

forb red-stem filaree, Erodium cicutarium, have been introduced from the Mediterranean region of southern Europe and have become very important species in the grazing regions of California.

In order to obtain some degree of objective method of evaluating the vegetative cover within the limits of the project area, a standard series of vegetational transects were completed through the site by Dr. George Lawrence in January, 1974. The process consisted of sampling the dominant vegetative cover type along a one-meter-wide strip for several hundred meters. Two such transects were made during the data collecting period, each of 500 meters length, giving a total of 1,000 linear meters of transect for analysis. Herbarium specimens were taken along the course of the transect studies in order to provide some basis for accurate determination of the classification of the plants counted within the transects.

Dr. Lawrence reports that this transect analysis does not intend to provide a taxonomic coverage of all isolated plants within any given area, but it serves to record those plants that form a conspicuous part of the plant cover within the several elevational zones of the site. An additional limitation in the analysis was imposed by the winter period of plant growth, since most plant species are in the best growth form during the late spring period of March through June.

Results of the transect data give some opportunity to compare the amount of grassland to the amount of area covered by forbs or herbaceous vegetation. In addition to these more dominant types of areas, the square meters of bare soil are also reported, which gives some measure of the impact of man's access roads through the area as well as denuded soil caused by rodent burrows, man's activity, and erosional channels along the westerly parts of the site.

In order to compare these vegetative types within the site, the following illustration was prepared to indicate the percentage cover of each of the vegetation and exposed soil types along the 1,000 meters of total transect. Only a very minor part of the area included trees and shrubs, and these were present on the banks of the most westerly drainage channels where direct exposure of solar energy is reduced by the slopes and where runoff water appears more concentrated. These same slopes are the areas where the most purely native vegetation and California wild flower species are found.

Conversely, the most level ground which has been available for grazing of livestock and vehicular access is the type of area with higher percentage of nonnative grasses and forbs. The amount of disturbance that the topsoil has sustained over past years has been a key factor in allowing the success of exotic or nonnative vegetation to gain a foothold. A map showing the elevational contour lines and transect routes follows the above-noted illustration. Results of the survey are found in Table IV, while a complete copy of Dr. Lawrence's report may be found in the appendix (page 102a).

TABLE IV

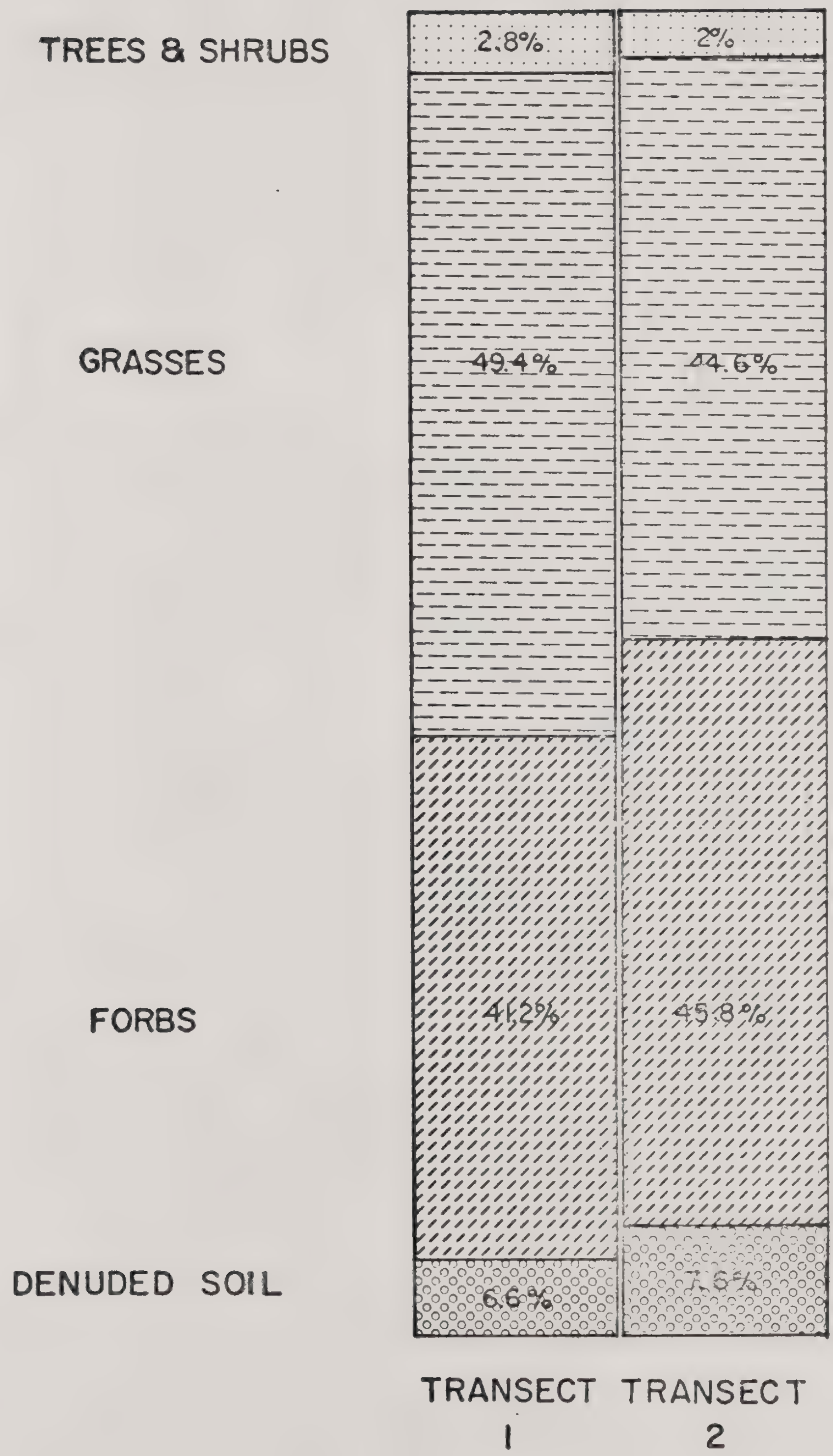
SUMMARY OF VEGETATION ON RIO BRAVO SITE
Reported in square meters per transect (500 meters)

		TRANSECT I	TRANSECT II
TREES AND SHRUBS	Populus fremontii Fremont cottonwood (n)	$14/m^2$	$10/m^2$
	Atriplex polycarpa Saltbush (n)		
	Hymenoclea salsola Cheezebush (n)		
	Isomeris arborea Burrofat bush (n)		
GRASSES	Avenua fatua Wild oat (e)	$247/m^2$	$215/m^2$
	Bromus rubens Red brome grass (e)		
	Bromus rigidus Ripgut brome grass (e)		
	Capriola dactylon Bermuda grass (a)		
	Hordeum murinum Foxtail barley (e)		
	Oryzopsis hymenoides Indian rice grass (n)		
FORBS	Astragalus lentiginosus Black loco weed (n)	$206/m^2$	$229/m^2$
	Amsinckia douglasiana Orange fiddleneck (n)		
	Brodiaea capitata Blue brodiaea (n)		
	Lupinus nanus Meadow lupine (n)		
	Oenothera dentata Sun cup (n)		
	Orthocarpus purpurascens Owls clover (n)		
	Eriogonum angulosum Pink buckwheat (n)		
	Eriogonum pusillum Dainty buckwheat (n)		
	Delphinium gypsophilum Gypsum larkspur (n)		
	Verbascum virgatum Turkey mullein (e)		
	Sisymbrium officiale Hedge mustard (e)		
	Erodium cicutarium Red-stem filaree (e)		
	Cucurbita foetidissima Wild gourd (n)		
	Hemizonia virgata Tarweed (n)		
	Salsola kali Tumbleweed (a)		
	Gilia tricolas Birds eye gilia (n)		
	Navarretia laucophylla White navarretia (n)		
	Corethrogyne filaginifolias Telegraph weed (n)		
	Chrysopsis villosa Yellow chrysopsis (n)		
	Centromadia pungens Spiny madia (n)		
	Solidago californica Goldenrod (n)		
	Salvia carduacea Thistle sage (n)		
ROCKY DENUDED SOIL	Areas of bare soil denuded both by rodent activity and access roads	$33/m^2$	$46/m^2$

Legend of the sources of plants on the Rio Bravo site includes many native plants and a number of nonnative plants from Asia and Europe.

Native Plant = n
European = e
Asiatic = a

Added 1-9-74 Lepidospartum squamatum Scaly composite (n)



PERCENTAGE OF VARIOUS VEGETATIVE TYPES OF MATERIAL FOUND
RIO BRAVO SPECIFIC PLAN AREA

DATE 5-20-75	KERN COUNTY PLANNING COMMISSION	FILE
DRAWN BY fs	BAKERSFIELD CALIFORNIA	

VEGETATIONAL TRANSECTS

RIO BRAVO SPECIFIC PLAN AREA

DATE	KERN COUNTY PLANNING COMMISSION	FILE
5-20-75	BAKERSFIELD CALIFORNIA	
DRAWN BY fs		

WILDLIFE

During the past hundred years within this part of California the primary designation of land use in the lower foothills has been in livestock production. As population increases and as people become more mobile, such land management practices as rural recreation and outdoor sporting activities gain in land usage.

Those species of vertebrate wildlife which are native to the Rio Bravo site that have been observed directly as well as noted indirectly are included in the citations in Table V. One limitation in this effort is to point out that resident populations of animals should be sampled during most of a year rather than during a brief period of December and January. Of course in addition to resident species are those which are nonresident or migratory. These gypsy forms of wildlife may be more numerous, both in actual numbers and in species, than those animals or birds which are resident in an area. The marsh hawk, Circus cyaneus, and other predatory hawks and owls do not depend on so small an area as this project site for actual total feeding area. This rule would also apply to the predatory badger that may spend some time in a given area but moves to adjacent sites as the rodent food supply determines.

MAMMALS are limited to those few species of rodents well adapted to grassland habitat. Cottontails, jackrabbits, ground squirrels, and some kangaroo rats are natural forms within the area. Rarer forms of predators that may move through the area, such as an occasional coyote, kit fox, or badger, may not depend on an area of this size except for a very small part of its feeding activity pattern.

BIRDS are abundant, both on the level grassy regions of the site and on denser slopes of the gully area to the west. Horned larks, Eremophila alpestris, meadowlarks, Sturnella neglectea, and house finches, Carpodacus mexicanus, are the most prominant numerically, and these typically are flocking forms so that they may appear to be very abundant at any one time. In view of their feeding behavior, which includes both weed seeds and insects, these birds are surely among the beneficial wildlife species in the area Some species of birds, such as the white crowned sparrow, Zonotrichia leucophrys, western bluebird, Siala mexicanus, pipit, Anthus spragueii, and western robin, Turdus migratorius, are clearly not dependent on this site as resident species but are normally migratory into such mild lower elevation grassy areas as this Kern River grassland. Recreational facilities of the adjacent Lake Ming represent a man-made habitat development for wildlife. The narrow, deeper course of the original Kern River in this area could probably not accommodate existing waterfowl populations that are present during much of the winter migratory period of the year. Many hundreds of ruddy ducks, pintail ducks, blue winged teal, pied-billed grebes, and some mallards can be seen on quieter regions of Lake Ming. The ever abundant American coot or mudhen is by far the most tolerant of man's water recreation activities and, at the same time, is the most abundant species on the lake.

REPTILES AND AMPHIBIANS are quite limited on the project site, with the tan-colored side-blotched lizard Uta stanburiana present on the more sandy parts of the area. The beneficial gopher snake, Pituophis catenifer, is an important predator on the pocket gopher population. This natural form of gopher control by biological control of harmful organisms by existing predators should be recognized as land uses change. The only amphibian species directly observed during this wildlife inventory was the tiny treefrog, which was present in the deepest gully area on site.

TABLE V

SUMMARY OF THE ANIMAL LIFE ON THE RIO BRAVO SITE

(The following organisms were observed directly or were developed from evidence of animal signs and burrow systems during the brief period of December 26, 1973, through January 8, 1974.)

MAMMALS

Audubon cottontail <u>Sylvalagus auduboni</u> (Ob)
California jackrabbit <u>Lepus californicus</u> (Ob)
Kangaroo rat <u>Dipodomys heermani</u> (Sn)
Badger <u>Taxidea taxus</u> (Sn)
Ferile cat <u>Felis domesticus</u> (Ob)
Beechey ground squirrel <u>Citellus beecheyi</u> (Ob)
Pocket gopher <u>Thomomys bottae</u> (Sn)

BIRDS

Marsh hawk <u>Circus cyaneus</u> (Ob)
Kestrel hawk <u>Falco sparverius</u> (Ob)
Burrowing owl <u>Speotyto cunicularia</u> (Rp)
Red-shouldered hawk <u>Buteo lineatus</u> (Rp)
Mourning dove <u>Zeniaduaa macroura</u> (Ob)
Meadowlark <u>Sturnella neglecta</u> (Ob)
Horned lark <u>Eremophila alpestris</u> (Ob)
Western robin <u>Turdus migratorius</u> (Ob)
Western bluebird <u>Siala mexicanus</u> (Ob)
Pipit <u>Anthus spraguell</u> (Rp)
American goldfinch <u>Spinus tristis</u> (Ob)
House finch <u>Carpodacus mexicanus</u> (Ob)
White-crowned sparrow <u>Zonotrichia leucophrys</u> (Ob)

REPTILES

Side-blotched lizard <u>Uta stanburiana</u> (Rp)
Gopher snake <u>Pituophis catenifer</u> (Rp)

AMPHIBIA

Pacific treefrog <u>Hyla regilla</u> (Ob)
Western toad <u>Bufo boreas</u> (Rp)

Sources of the vetegrate animal list:
Observed directly = Ob
Animal signs seen = Sn
Reported by others = Rp

AESTHETICS

The natural aesthetic environment was discussed under the visual subsection of this section. The aesthetic environment has been greatly influenced by man-made structures and development. These areas of influence include public facilities--Kern River Golf Course, group picnic area, Lake Ming, and Kern River County Park and Campground--and private development--Rio Bravo Tennis Club. The last-mentioned facility was developed by the project proponent. Aesthetically, structures at the tennis club are designed with much exposed wood for beams and siding. Plastic materials on and around the building include stucco, concrete, concrete block, and asphaltic concrete. This last material is used primarly in parking areas and on the tennis courts, while other materials are used for siding, curbing, and paving. An analogous color scheme utilizing earthen tones was employed. This results in somewhat of a reflection of the natural visual color patterns. Landscape materials employed include turf, specimen trees, shrubbery, and river boulders. The use of these items tends to soften the impact of a man-made structure; however, the line marking the end of the development still presents a harsh contrast of visual experience.

Kern River Golf Course is laid out on the undulating hills northeasterly of the site and consists of an 18-hole course, putting green, pitching green, driving range, parking lot, clubhouse, and group picnic area. The paved parking lot presents the most contrasting feature of this site; however, recently planted trees within that area will ultimately provide a continuity between the parking lot and golf course. The clubhouse is basically a glass and stucco structure that is painted to reflect the shrubbery surrounding that building. The course is heavily turfed and, as is typical of golf courses, the fairways are tree

lined. Many of the trees are mature specimens; however, most of the trees are not native or indigenous to the area. Therefore, while the impact of a man-made facility has been lessened by extensive use of plant materials, the site presents a contrast to the natural visual scene.

The group picnic area is an extension of the golf course design and presents a similar aesthetic appearance. A large parking lot, void of any plant life, contrasts greatly with the existing natural and man-made landscape.

Many years of existence have allowed the shores of Lake Ming to become "mellowed" and more reflective of a natural reservoir rather than man-made. However, the docking area and marina is a visual intrusion on the residually placid aesthetic appearance. The lack of natural shore-side trees gives the lake a stark, incomplete atmosphere that could be remedied as trees now planted increase in size.

As a new facility, Kern River County Park Campground is quite aesthetically pleasing, with massive areas planted in turf trailing off into the natural vegetation both on the flat and hillside areas and at riverside. As the trees recently planted begin to mature, the area will give the appearance of a natural outgrowth on the Kern River Plain.

ILLUMINATION

Until Rio Bravo Tennis Club was developed, artificial illumination was dependent on protective lighting devices at the Lake Ming Marina and at the pro-shop at the golf course. The few residences in the area are illuminated similarly to other residences, while campers or hikers might light their way with lanterns or flashlights. The tennis club has increased the amount of lumens in the

area due to night lighting of the tennis courts. Actual amounts of increase have not been studied; however, devices have been designed to provide direct lighting to the courts with minor projections of light skyward.[1] Lateral dispersion of light has been increased. Protective lighting in the parking lot and lighting inside and around the clubhouse is "subdued" and allows only minor amounts of increased illumination.

AIR QUALITY AND NOISE LEVELS

The project site is located in the southerly portion of the San Joaquin Valley Air Basin, as established by the California Air Resources Board. The San Joaquin Valley Air Basin, which comprises 19 percent of the state's land area and 8.2 percent of the state's population, contributed the following percentages of the total amount of air pollutants in the state in 1970:

Organic gases	10.0%
Particulate matter	16.0%
Oxides of nitrogen	9.9%
Sulfur Dioxide	9.9%
Carbon monoxide	9.7%

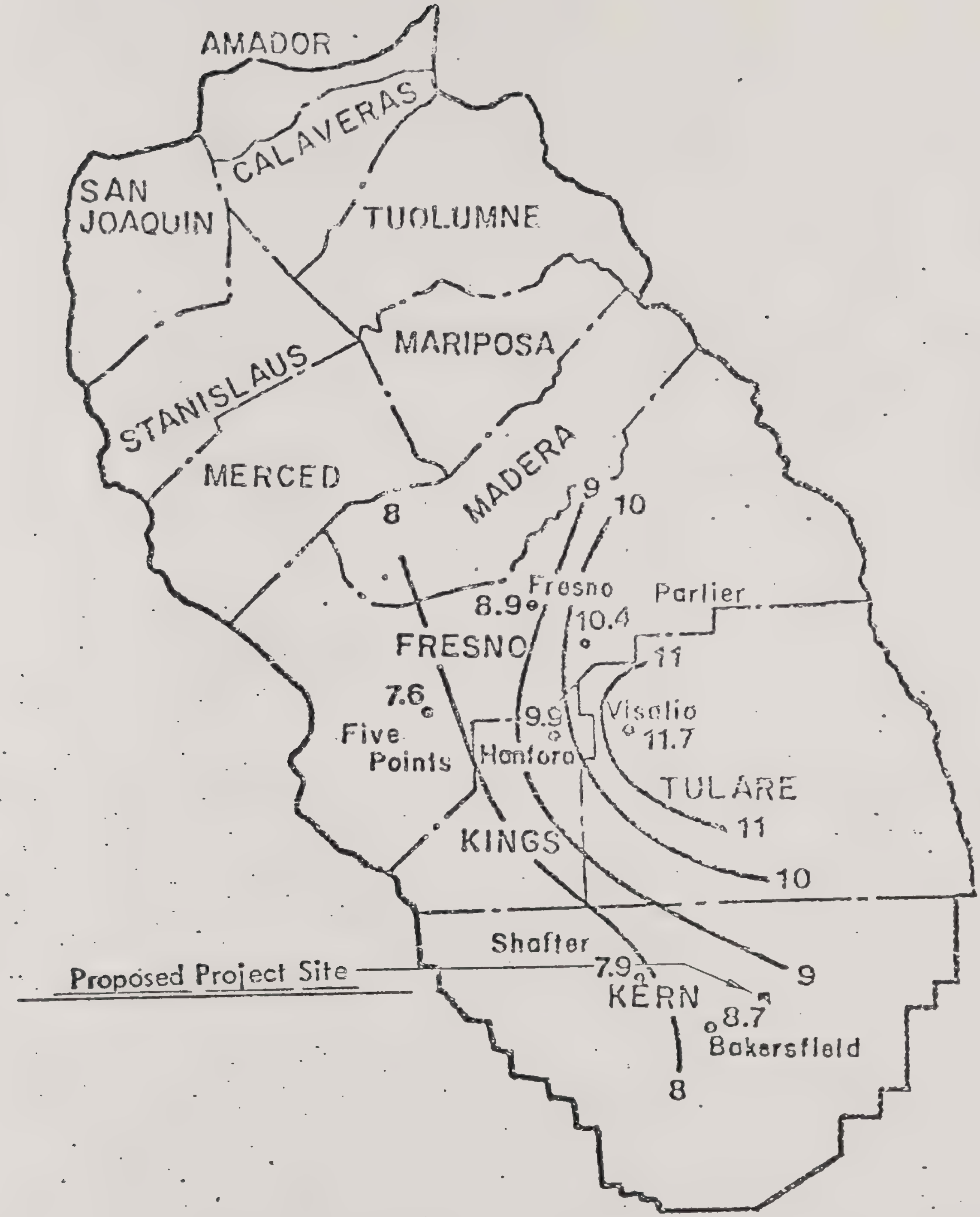
Summary data for the pollutants listed above are shown in Table VI.

The closest full air monitoring station to the proposed project is located at Kern Medical Center, Bakersfield, approximately ten miles southwest of the proposed site.

The project site is within the Bakersfield-Visalia-Fresno smog belt, as evidenced by the distribution of oxidant concentrations shown on the following page.

---

1 See specifications in appendix



DISTRIBUTION OF OXIDANTS

Average of Daily Maximum One-Hour Oxidant Concentrations
During August 1972
(pphm)

SOURCE: AIR QUALITY IN THE
SAN JOAQUIN VALLEY AIR BASIN

PLATE VIII

TABLE VI

COMPARISON OF EMISSIONS FROM STATIONARY
AND MOBILE SOURCES - SAN JOAQUIN VALLEY AIR BASIN

1970
(Tons per Day)

	Organic Gases Highly Reactive	Organic Gases Total	Particulate Matter	Oxides of Nitrogen	Sulfur Dioxide	Carbon Monoxide
Stationary	46	356	218	122	62.9	382
Mobile	279	399	23	213	11.6	1,980
TOTALS	325	755	241	335	74.5	2,362
Stationary	14%	47%	90%	36%	84%	16%
Mobile	86%	53%	10%	64%	16%	84%

Source: Air Quality in the San Joaquin Valley Air Basin
Resources Agency, Air Resources Board
September, 1973, page 11

Sulfur dioxide concentrations in the San Joaquin Valley have been monitored at times in the past; however, continuous measurements are not available. Past measurements indicate very low concentrations of sulfur dioxide in the valley air.

High suspended particulate matter concentrations have been and continue to be a persistent problem in the San Joaquin Valley Basin. An air monitoring station, measuring particulate matter only, is located in Bakersfield. Data from this station for 1970, 1971, and 1972 are shown in Table VII and give a general picture of the suspended particulate matter concentrations in the project region. It should be noted that all observations are above the state suspended particulate matter standard of 60 micrograms per cubic meter (Mg/m^3) annual geometric mean.

TABLE VII

TOTAL SUSPENDED PARTICULATE MATTER
CONCENTRATIONS FOR SOME SAN JOAQUIN VALLEY
AIR MONITORING STATIONS (Mg/m^3)

Year	Bakersfield
1970	170
1971	167
1972	160

Recent air quality data for 1974 are given on the following page.

Ambient noise levels have been determined at the project site by the Kern County Department of Environmental Health. These levels are compared to those standards acceptable for residential development. The area is generally described as being very quiet; however, excess noise levels can be expected from power boat racing on Lake Ming.

The Health Department, on February 22-23, 1975, monitored the noise levels of outboard racing activities on Lake Ming. The results are given in Table VIII.

For additional discussion concerning the present noise environment, see the Health Department memorandum dated March 20, 1975, in the appendix.

CONCENTRATION OF CONTAMINANTS
FOR JANUARY, FEBRUARY & MARCH, 1974
(in parts per million)

Contaminant	January			February			March			Averages		
	Max	Avg	Pk	Max	Avg	Pk	Max	Avg	Pk	Max	Avg	Pk
Oxidant	.07	.03	.08	.07	.04	.14	.11	.06	.12	.08	.04	.11
Carbon Monoxide	17	7	34	21	8	25	11	5	16	16	7	25
Nitrogen Dioxide	.07	.04	.08	.10	.05	.10	.09	.05	.10	.09	.05	.09
Nitric Oxide	.40	.19	.48	.42	.19	.44	.26	.09	.36	.36	.16	.43
Oxides of Nitrogen	.43	.22	.51	.47	.23	.50	.29	.13	.40	.40	.19	.47
Hydrocarbons	12	8	18	12	9	20	10	6	17	11	8	18

TOTALS

Maximum	27.93
Average	15.44
Peak	44.10

PARTICULATE MATTER
Micrograms/Cubic Meter

Location	January		February		March		Averages	
	Max	Avg	Max	Avg	Max	Avg	Max	Avg
Bakersfield - Health Dept.	152	105	242	152	160	111	185	123
Bakersfield - Chester Avenue	139	96	304	153	143	103	195	117
Taft	76	59	103	70	76	51	85	60

DAILY MEAN COH VALUES* - 1974
No. of Days 0.9 is Exceeded and Average Value

	January		February		March		Averages	
	Days	Value	Days	Value	Days	Value	Days	Value
Bakersfield - Chester Avenue	4	1.03	0	-	0	-		

* COH - Coefficient of haze per 1,000 linear feet of air sampled. COH units less than 1.0 indicate relatively clean air.

TABLE VIII

NOISE LEVEL STUDY

Description:	Ambient Noise	Condominium Site	Subdivision Site
Date:	11/18/74	2/22/75	2/22/75
Time:	3:00-3:30 p.m.	10:23-11:23 a.m.	11:33 a.m.-12:33 p.m.
No. of Samples:	1733	3583	3604
L maximum	56 dB(A)	68 dB(A)	75 dB(A)
L_1	52 dB(A)	61 dB(A)	67 dB(A)
L_{10}	46 dB(A)	56 dB(A)	60 dB(A)
L_{50}	42 dB(A)	48 dB(A)	43 dB(A)
L_{90}	41 dB(A)	40 dB(A)	40 dB(A)
L_{99}	40 dB(A)	40 dB(A)	40 dB(A)
L_{eq}	44.3 dB(A)	53.2 dB(A)	56.5 dB(A)

Note: dB(A) means decibels, A-weighted, re: 20 micropascals. L_x means the level exceeded X% of the time; L_{eq} means the energy-equivalent level

TRANSPORTATION

The proposed project, located north of and contiguous to Alfred Harrell Highway and both sides of Lake Ming Road (County Road No. 2239), is accessible from Bakersfield via Alfred Harrell Highway through Hart Park or via State Highway 178 and Alfred Harrell Highway.

Alfred Harrell Highway is a four-lane divided free ay from Mt. Vernon Avenue and Panorama Drive in Bakersfield to Hart Park, 2.5 miles west of the project. Within the park, the highway is reduced to a low-speed (25 mph), two-lane road approximately 40 feet in width. Easterly of the developed portion of Hart Park and to State Highway 178 (1.5 miles southerly of the project), Alfred Harrell Highway continues as a two-lane road with an approximate 200-foot width on a right-of-way designed for ultimate freeway capacities.

State Highway 178, beginning at downtown Bakersfield, is a six-lane divided freeway to east of Oswell Street and then becomes a two-lane highway to Alfred Harrell Highway.

Typical travel times and distances to the project are listed below:

Location	One-way Distance		Average Travel Time[1]
Oswell and Niles	8.1[2]	12.2[3]	12 min/19 min
Mt. Vernon and Columbus	8.6	10.0	11 min/13 min
Downtown Bakersfield	12.4	13.8	17 min/19 min
Freeway 99 at 24th Street	13.5	14.9	19 min/21 min
Meadows Field	16.1	12.6	28 min/17 min
Wible Road & Ming Avenue (Valley Plaza)	16.9	18.3	24 min/26 min
Cal State College	18.8	19.2	28 min/30 min

---

(1) By auto only; travel time at legal limits

(2) Via State Route 178

(3) Via Hart Park

Distances were calculated by using the most direct route upon leaving the site. Travel time was calculated between 8:30 a.m. and 11:00 a.m., April 30, 1975. Driving conditions included clear skys and roads with no obstructions (e.g., road work, accidents, etc.) to hamper driving. A map of the routes taken is on the following page.

Records of the Kern County Road Commissioner's 1974 Traffic Survey indicate the annual ADT (average daily traffic) as indicated below. The Road Department indicates that one may calculate peak month ADT at about 1 1/2 times the ADT and the peak hour at about 15 percent of the ADT.

Road	Location	ADT	ADT (Peak Mo.)	Peak Hour
Harrell Highway	East of Hart Park	900	1350	203
Harrell Highway	North of Hwy. 178	900	1350	203
Harrell Highway	West of Hart Park	2000	3000	450

Traffic turning off Alfred Harrell Highway onto Lake Ming Road consists mainly of vehicles bound for the county recreational areas--Kern County Campground, Lake Ming, Kern River Golf Course, and the group picnic area. The traffic fluctuates from extremely light to excessively heavy, depending upon the nature of events staged at various areas. The heavy traffic use is short-term and takes place occasionally. As would be expected with recreational areas, the traffic is heavier during the spring and summer months and on weekends.

An example of traffic fluctuations is given in Table IX. This information is for the Lake Ming area, excluding the golf course and group area, and was taken from the 1974 records of the Parks and Recreation Department.

TABLE IX

LAKE MING TRAFFIC, 1974
(in cars/day)

Month	Cars	Monthly ADT	Average Weekday	Average Weekend Day Including Holidays	Peak Day
Jan.	3,633	117	71	230	608
Feb.	5,382	192	164	237	571
Mar.	10,158	328	124	755	2,119
Apr.	12,526	418	351	600	1,643
May	20,285	654	324	1,603	2,281
June	19,172	639	390	1,137	2,020
July	21,163	683	471	1,200	1,774
Aug.	19,341	624	490	951	1.634
Sept.	16,682	556	252	1,164	1,995
Oct.	8,097	261	100	726	1,689
Nov.	6,239	208	86	493	1,578
Dec.	2,240	75	57	111	156
Average Month	12,077	397	240	782	1,531

In addition, the 1974 traffic to the group picnic area east of the golf course was 87,216 or 239 ADT. Assuming this traffic fluctuates proportionately to the Lake Ming traffic, the peak month ADT is 411, the average weekend day is 800, and the peak day is 1,220.

The golf course peak season is March, April, and May; the peak weekend day is 300 rounds per day. Assuming all rounds of golf consist of four persons, the following number of vehicles using Lake Ming Road to get to the course is calculated:

Persons Per Car	Peak ADT
4	300
3	400
2	600
1	1,200

The annual total play is 60,000 rounds. This results in the monthly totals set forth in Table X.

The capacity of a highway to carry traffic is measured by its service volume in vehicles per hour. The service volume for a two-lane highway, similar to Alfred Harrell Highway or Lake Ming Road, is 900 vehicles per hour.[1] This is for a level of service that is still in the zone of stable flow, and a relatively satisfactory operating speed can be maintained for short periods of time.

[1] State Highway Capacity Manual

TABLE X

GOLF COURSE ATTENDANCE

Month/Year	Attendance[1]	Monthly Vehicles[2]	Peak Day Attend.[3]	Peak Day ADT
May, 1974	6,397	3,198	322	161
June, 1974	5,762	2,881	290	145
July, 1974	5,257	2,628	265	132
Aug., 1974	4,191	2,095	211	105
Sept. 1974	4,057	2,028	204	102
Oct., 1974	4,104	2,052	207	103
Nov., 1974	4,388	2,194	221	110
Dec., 1974	3,730	1,865	188	94
Jan., 1975	4,172	2,087	210	105
Feb., 1975	4,587	2,293	231	115
Mar., 1975	5,855	2,927	295	147
Apr., 1975	6,359	3,179	320	160
	58,861			

[1] Source: Chet Foss, Kern River Golf Course

[2] Ibid, estimating two golfers/vehicle

[3] Source: Chet Foss, Kern River Golf Course; other peak day figures based on ratio 320:6359

At the present time, no other types of transportation are available to the area. Parking is presently available at the various public and private facilities in the area in the following amounts:

Facility	Estimated Parking Spaces (paved)
Lake Ming	762*
Kern River Golf Course	215
Kern River Group Picnic Area	300
Kern River Campground & Picnic Area	125
Rio Bravo Tennis Club	94 (216 proposed)

ZONING AND LAND USE

The project property is presently zoned R-1 (see following page). The Land Use Element Map for the region (shown following zone map) indicates the use as urban expansion and recreational. It is intended to initiate zone change proceedings on the condominium and subdivision sites to obtain R-1 P-D zoning. The Open Space and Conservation Element Map indicates urban influence and recreation for this area. The Bakersfield Metropolitan Area General Plan indicates that the area to the north of Alfred Harrell Highway should be preserved "as an open recreational and scenic area." In addition, the General Plan states: "The basic idea is to prohibit urban type construction, not to close the area to agriculture or commercial recreation."

There is presently no use of the project property save for the existing tennis club site. The land has been used in the past for sheep grazing. Bordering the project are the above-mentioned recreational sites owned and maintained by

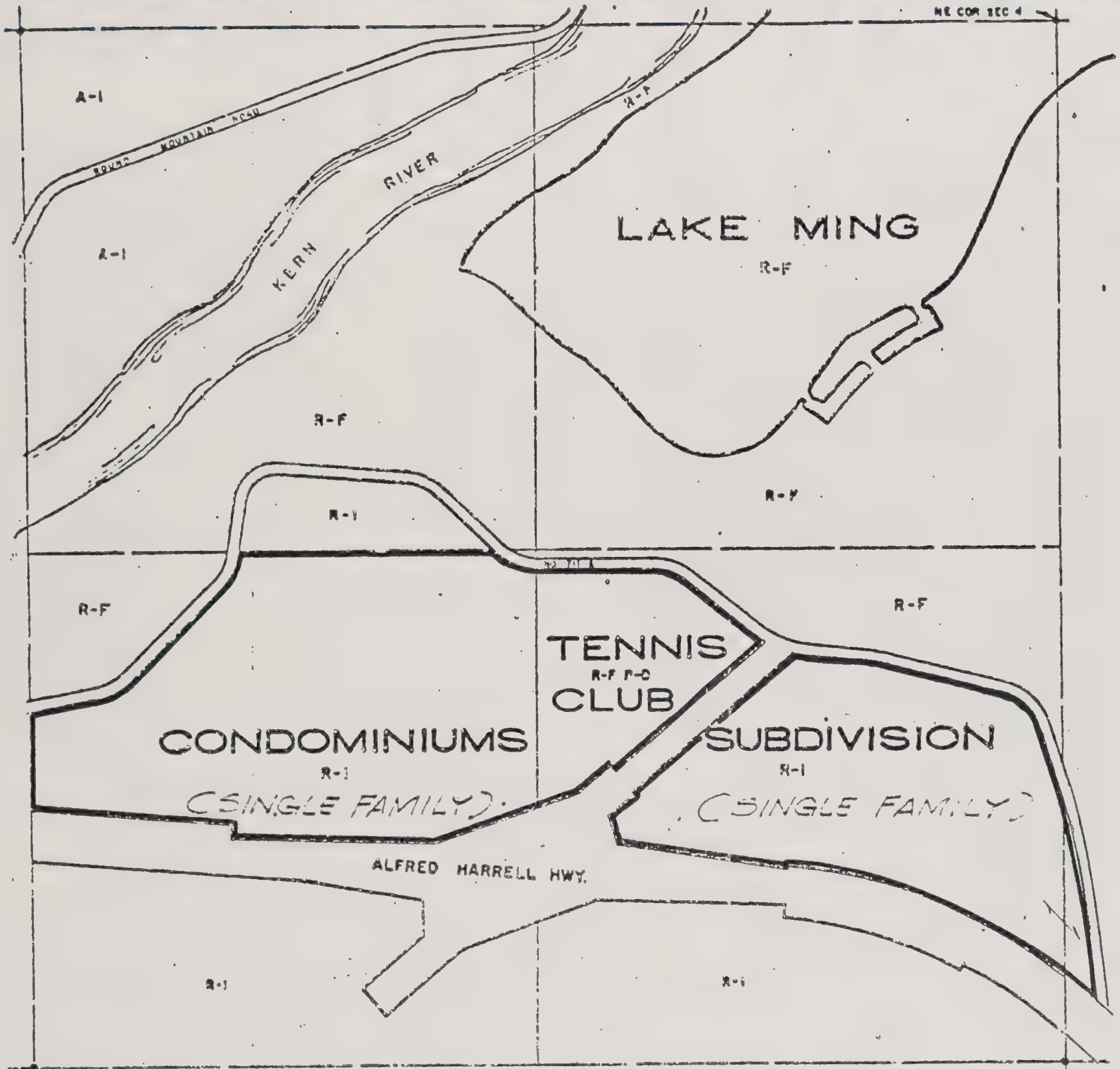
* Includes spaces presently put out to bid by Public Works Department

ZONING MAP 104-4

(SEC. 7297.73) OF THE ORDINANCE CODE OF KERN COUNTY

SEC. 4 T.29S. R.29E. M.D.B.M.

KERN COUNTY CALIFORNIA



AMENDMENTS:
(A) ORD. G-1634 DATED JUNE 13, 1972

LEGEND

R-1	ONE-FAMILY DWELLING ZONE
R-2	TWO-FAMILY DWELLING ZONE
R-3	LIMITED MULTIPLE-FAMILY DWELLING ZONE
R-4	MULTIPLE-FAMILY DWELLING ZONE
R-S	SUBURBAN RESIDENTIAL ZONE
E-1	ESTATE ZONE
E-2	ESTATE ZONE
E-3	ESTATE ZONE
C-O	PROFESSIONAL OFFICE ZONE
C-1	NEIGHBORHOOD COMMERCIAL ZONE
C-2	COMMERCIAL ZONE
M-1	LIMITED MANUFACTURING ZONE
M-2	LIGHT MANUFACTURING ZONE
M-3	GENERAL MANUFACTURING ZONE
A-1	LIGHT AGRICULTURAL ZONE
A-2	GENERAL AGRICULTURAL ZONE
R-F	RECREATIONAL-FORESTRY ZONE
U	UNCLASSIFIED ZONE
P	AUTOMOBILE PARKING ZONE
D	ARCHITECTURAL DESIGN ZONE
H	AIRPORT APPROACH HEIGHT ZONE
B	BUFFER ZONE
P-D	PRECISE DEVELOPMENT ZONE

WE HEREBY CERTIFY THAT THIS OFFICIAL "ZONING MAP" WAS ADOPTED IN THIS FORM BY RESOLUTION OF THE PLANNING COMMISSION OF THE COUNTY OF KERN, STATE OF CALIFORNIA, AT A REGULAR MEETING THEREOF HELD ON THE 6TH DAY OF JUNE 1960.

CHAIRMAN SECRETARY

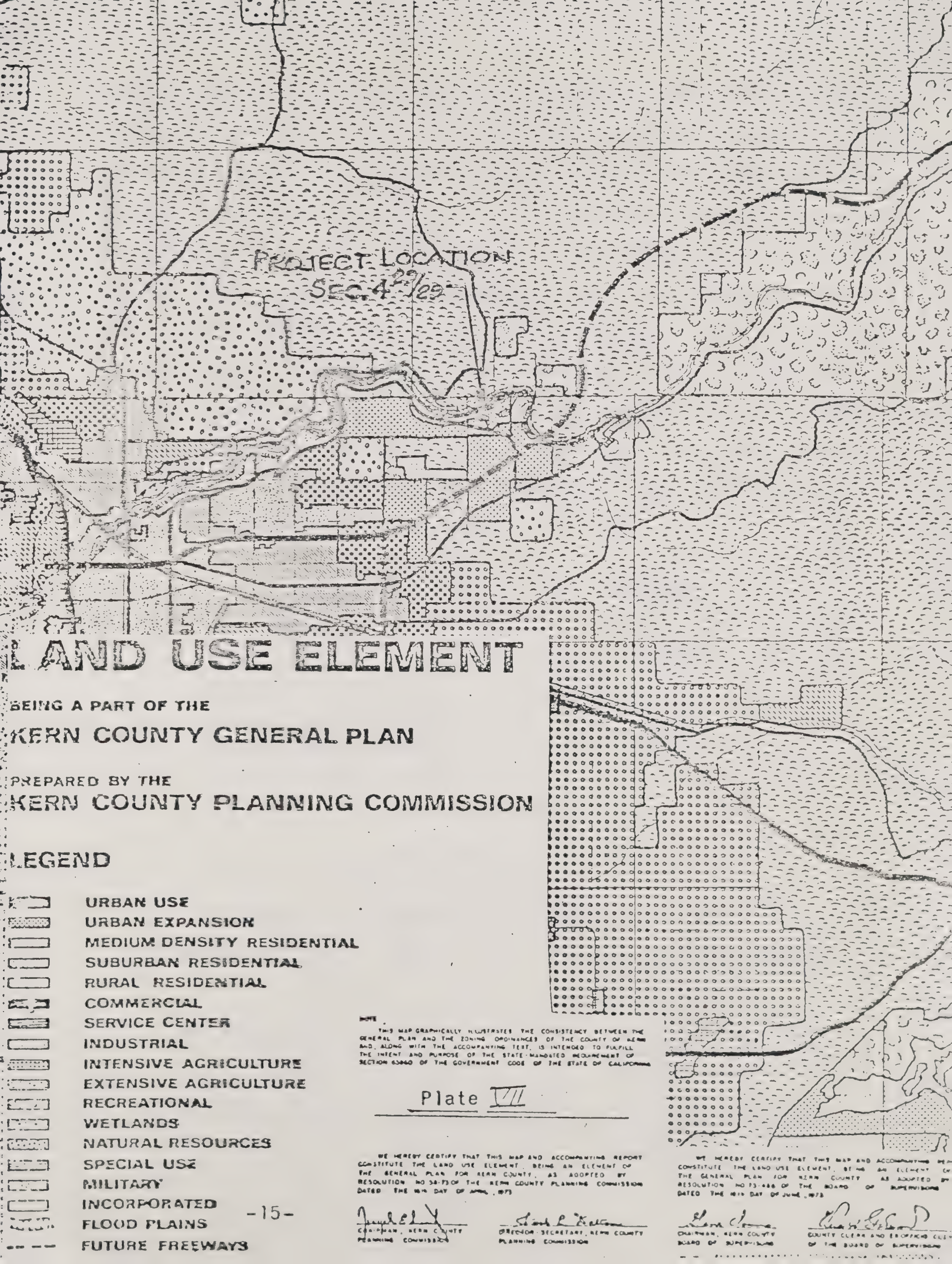
WE HEREBY CERTIFY THAT THIS OFFICIAL "ZONING MAP" WAS ADOPTED AS AN AMENDMENT TO THE OFFICIAL "LAND USE ZONING ORDINANCE OF THE COUNTY OF KERN" BY THE BOARD OF SUPERVISORS OF THE COUNTY OF KERN, STATE OF CALIFORNIA, AT A REGULAR MEETING THEREOF HELD ON THE 5TH DAY OF JULY 1960, BY AN ORDINANCE PASSED BY SAID BOARD

CHAIRMAN OF THE BOARD CLERK

SCALE IN FEET 0 400 800 1200

KERN COUNTY PLANNING COMMISSION

ZONE MAP


PROJECT LOCATION
SEC. 4 29/29
LAND USE ELEMENT
BEING A PART OF THE
KERN COUNTY GENERAL PLAN
PREPARED BY THE
KERN COUNTY PLANNING COMMISSION
LEGEND
URBAN USE
URBAN EXPANSION
MEDIUM DENSITY RESIDENTIAL
SUBURBAN RESIDENTIAL
RURAL RESIDENTIAL
COMMERCIAL
SERVICE CENTER
INDUSTRIAL
INTENSIVE AGRICULTURE
EXTENSIVE AGRICULTURE
RECREATIONAL
WETLANDS
NATURAL RESOURCES
SPECIAL USE
MILITARY
INCORPORATED
FLOOD PLAINS
FUTURE FREEWAYS
NOTE
THIS MAP GRAPHICALLY ILLUSTRATES THE CONSISTENCY BETWEEN THE GENERAL PLAN AND THE ZONING ORDINANCES OF THE COUNTY OF KERN AND, ALONG WITH THE ACCOMPANYING TEXT, IS INTENDED TO FULFILL THE INTENT AND PURPOSE OF THE STATE-MANDATED REQUIREMENT OF SECTION 65860 OF THE GOVERNMENT CODE OF THE STATE OF CALIFORNIA
Plate VII
WE HEREBY CERTIFY THAT THIS MAP AND ACCOMPANYING REPORT CONSTITUTE THE LAND USE ELEMENT, BEING AN ELEMENT OF THE GENERAL PLAN FOR KERN COUNTY, AS ADOPTED BY RESOLUTION NO 58-73 OF THE KERN COUNTY PLANNING COMMISSION
CHAIRMAN, KERN COUNTY PLANNING COMMISSION
DIRECTOR-SECRETARY, KERN COUNTY PLANNING COMMISSION
WE HEREBY CERTIFY THAT THIS MAP AND ACCOMPANYING REPORT CONSTITUTE THE LAND USE ELEMENT, BEING AN ELEMENT OF THE GENERAL PLAN FOR KERN COUNTY AS ADOPTED BY RESOLUTION NO 73-466 OF THE BOARD OF SUPERVISORS
CHAIRMAN, KERN COUNTY BOARD OF SUPERVISORS
COUNTY CLERK AND EX-OFFICIO CLERK OF THE BOARD OF SUPERVISORS

the County of Kern. Kern River State Park consists of property between Alfred Harrell Highway and the Kern River, reserved for recreational uses and recently transferred from the state jurisdiction to the County of Kern. The county has recently completed and dedicated (July, 1974) a recreational vehicle overnight campground facility and day use picnic site on the south bank of the Kern River, directly northwest of the proposed condominium site. The Kern County Boat and Ski Club and Bakersfield Outboard Racing Association sponsor power boat regattas and drag racing on several occasions each year on Lake Ming, a 110-acre man-made power boating and water ski facility located directly north of the tennis ranch. The Kern River Golf Course is an 18-hole professional course, and the picnic area is used by groups and clubs throughout the year. Following is a more thorough description of these uses.

Acreage of Uses	Gross Area
Golf course	155 acres
Group picnic area	5 acres
New campground	30 acres
New picnic area	30 acres
Lake Ming (water surface)	110 acres
Picnic areas, parking and marina	20 acres
Unused (future expansion)	50 acres
Total (in vicinity of project)	400 acres

Facilities Available

Facility	Parking	Camp Sites	Picnic Sites	Other
New campground	125	50	80	4 restrooms, trailer dump station, water system, roads
Lake Ming	762 est.	--	35	160 boat slips, concession stand, playground, restrooms
Group picnic area	300	--	--	Group picnic area reportedly capable of handling up to 10,000 persons per day

Events at Lake Ming

The Bakersfield Outboard Racing Association schedules four outboard races per year. These are a circle-course-type race. Spectators attend these races, and admission is free. Attendance is not high.

The Kern County Boat and Ski Club schedules five weekend events: four boat drag races and one slalom-type water skiing event.

The boat drag races are on a 1/4 mile straight course and are extremely well attended by spectators, who are charged admission to these events. These drag races start at 9:00 or 10:00 in the morning and go until sunset. There are usually about 150 boats entered in each day's races. These boats are noisy,[1] and these events are probably the highest noise-producing factor to the area.

The water skiing event consists of slalom water skiing events one day and circle-type speed races the other day.

In addition to the above, Lake Ming is used by power boaters and water skiers for recreational purposes. Fishing or other recreational uses of Lake Ming are not permitted.

Golf Course

Kern River Golf Course is an 18-hole, 6,300-yard, par 70 professional golf course. It is reached via Lake Ming Road, but a separate road goes to the clubhouse. The parking lot has parking space for 215 cars. Statistics are:

55,000-60,000 rounds per year
Peak season is March, April, and May
Peak weekend day is 250-300 rounds/day
Peak weekday is 55% of weekends = 140-165 rounds/day
Average weekend day = 230 rounds/day
Average weekday = 130 rounds/day

---

[1] Unlimited class nitro-methane fuel burners obtaining terminal velocities of 190+ mph

Kern River is the busiest Kern County course; North Kern has 45,000 rounds per year and Buena Vista 35,000.

DRAINAGE

Minor drainage courses traverse the property, with the watershed being 190 acres for the tennis ranch and condominium sites. Applicant's representative has calculated peak runoff from this watershed in its natural state to be 102 cubic feet per second (cfs). Applicant's representative has also estimated maximum quantity of runoff from the project site during a 100-year storm to be ten acre-feet.[1] Mean annual runoff has also been estimated to be five acre-feet. The subdivision (eastern) portion of the proposed project appears to be totally isolated from outside drainage except for a channel which passes surface flows from south of Alfred Harrell Highway through the site north to Lake Ming.

The most obvious and probably the most effective influence on the total volume of runoff is the long-term balance between the amount of water gained by a catchment area in the form of meteoric water and the amount of water lost from the catchment area in the form of evapotranspiration (ET). In this sense, climate of a catchment area sets the broad upper limits to the total volume of flow leaving the area, but this relationship between annual totals and means of rainfall and ET may be modified by short-term factors, such as the manner in which precipitation occurs and sudden changes in vegetative cover.

---

[1] See appendix for Planning staff's calculation of maximum expected runoff (page 213a).

This can be illustrated by considering the example of a catchment area receiving a mean annual rainfall (R) of 15 centimeters and having a mean annual potential evapotranspiration (PE) loss of 10 centimeters. If both water loss and gain occur uniformly throughout the year, the runoff may be about 5 centimeters (i.e., 15-10=5). If, however, all the rain falls during the high water loss season, runoff may be zero (i.e., PE 25 centimeters, R 15 centimeters), whereas if it falls during the low water loss season (i.e., PE 5 centimeters, R 15 centimeters), runoff may represent about 10 centimeters.

Short-term variations as well as the seasonal distribution of rainfall must, however, also be taken into account. Thus, an amount of rain falling as a number of isolated showers is far less likely to contribute to streamflow than the same amount of rain falling as one continuous heavy storm.

Yet another factor which, it is often argued, is likely to affect the balance between rainfall and evapotranspiration losses is the vegetative cover of the catchment area, particularly if this is subject to rapid changes; but there is much conflicting evidence on this point.[1] Many authorities[2] believe that even a complete change from forested to nonforested conditions will alter only the timing, and not the total amount of runoff.

Undoubtedly, the most important effect of the vegetation cover is to slow down the movement of water over the surface after rainfall and thus to allow more time for infiltration to take place. In this way the timing of runoff after

---

[1] Ward, R. C., Principles of Hydrology, McGraw-Hill, 1967

[2] Kazman, Penman, U.S.D.A., Meyer, et al. (hydrologists)

rainfall may be considerably modified. Furthermore, peak runoff will tend to be much lower, although more prolonged, where vegetation is effective in this way, since the surface runoff contribution to streamflow will be low in comparison with the groundwater contribution.

See "Existing Rio Bravo Catchment Drainage Pattern" photo-map on the following page for drainage direction and pattern.

PUBLIC SERVICES AND UTILITIES

Proposed project area is presently policed by the Kern County Sheriff's Department operating out of the main office in Bakersfield, 13 miles southwest of the project site.

The County Park area, including campgrounds, picnic areas, Lake Ming, and golf course, is patrolled by seven full-time park rangers. They provide 100 percent coverage of the area. They have full police officer powers.

Fire protection is provided by the Kern County Fire Department operating out of the Niles Street, La Cresta, and Edison Stations, 7.5, 10, and 7.6 miles respectively from the project site.

The project site is within the service areas of Pacific Gas and Electric Company, Pacific Telephone, Warner Cable T.V., and the Olcese Water District. An aerial 12 KV primary distribution cable system exists on River Drive and provides two point sources of 12 KV underground cables that originate at the south of the Kern River Golf Course entrance and Lake Ming concession stand, terminating south of the Rio Bravo Tennis Ranch. Gas for the project could be supplied by Pacific Gas and Electric Company. However, at the present time, the nearest gas lines are approximately seven (7) miles away.

Solid waste disposal is presently provided by independent collectors. The Kern County Parks and Recreation Department now collects for the golf course, Lake Ming, campground, and picnic areas.

Pacific Telephone provides telephone services to this area from an aerial line that runs along the eastern side of the proposed subdivision on County Road 711. An underground telephone line having a 300 pair[1] capacity originates at the intersection of County Road 711 and Alfred Harrell Highway and terminates at the Rio Bravo Tennis Ranch.

Project site is located in the Olcese Water District, a California Water District, which obtains water from the Kern River approximately 1/2 mile east of the northeastern end of the subdivision portion of this project. The water is treated at this point, then pumped in a 12-inch internal diameter concrete pipe to a water storage reservoir which has a capacity of 300,000 gallons. This pipe continues from the storage reservoir to the Rio Bravo Tennis Ranch, where it terminates in the southern portion of the parking lot.

Most sewage effluent disposal in the Lake Ming area is by septic tank and leach line method.

Solid waste from the area is disposed of at the City of Bakersfield Sanitary Landfill. This fill site is expected to last until 1980, if the present disposal rate of 750 tons per day stays constant.

---

[1] One pair means one private party line

SCHOOLS

Schools serving the area are in the Bakersfield City School District and the Kern High School District. Bakersfield College, a two-year college, and Cal State Bakersfield, a four-year college, are within eight and twenty miles respectively of the project site. The schools presently serving the area are Eissler Elementary, Chipman Junior High, and Highland High School. School bus transportation is presently provided by the Bakersfield City Schools Transportation Department. The bus presently stops at the golf course at 7:23 a.m. and delivers children to all three of the above schools.

The project is located in the existing attendance area for Eissler Elementary School, grades kindergarten through 6, and Chipman Junior High School, grades 7 and 8, both of the Bakersfield City School District. The District could give consideration to placing the project in the Hort Elementary and Compton Junior High Schools; however, the current inclination is to maintain the existing schools for attendance.

The following are enrollments for the various schools:

	Eissler	Chipman	Hort	Compton
January enrollment	412	714	418	656
School capacity (permanent)	420	795	420*	700

* includes relocatable classrooms on Hort School site

There are now 24 students being transported to Eissler, Chipman, and Highland Schools in a 42-passenger bus operated by the Bakersfield City School District.

The project is located in the Kern High School District. The closest high school is Foothill, at 501 Park Drive, Bakersfield, a distance of eight miles from the project. The average daily attendance for this school for the 1973-1974 school year was 1816, near its capacity.

Kern High Schools serve grades 9 through 12. It is District policy to provide transportation for any student who does not live within a two-mile radius of the school he is attending. Bus stops are determined for each year, dependent upon the number of students being served in an area. There are no plans for high school construction in the project area. At present, high school students in the area are transported to Highland High School by a Bakersfield City School District bus mainly because of convenience and consolidation of transportation because of the small number of students and the proximity of all the schools to each other. The high school students from the project may or may not continue at Highland depending upon school capacities, attendance boundaries, and District policy as determined by the District each year.

Present average educational costs for children kindergarten through grade 12 are as follows:

School District	Local Monies per ADA*	State Monies per ADA*	Total Cost per ADA*
Bakersfield City School District	$ 300	$ 700	$1,000
Kern High School District	$1,040	$ 260	$1,300

* ADA = average daily attendance, which is, for all practical purposes, per student

Nearby recreational facilities are as previously discussed with Lake Ming, campground, golf course, and tennis ranch. Additional recreation, such as

bowling alleys and theaters, as well as medical and dental facilities, are available in Bakersfield. Shopping centers and commercial areas also exist in Bakersfield.

HOSPITALS - PHYSICIANS

The nearest hospital with emergency unit facilities is Kern County Medical Center. The project area is served by both Hall Ambulance Service[1] and Flinn Ambulance Service[2] on a "rotating" basis. Response time to the project site for Hall is about eight minutes. Response time for Flinn is about eleven minutes. Round trip travel time in an emergency situation to the project site and back to Kern County Medical Center would be about fifteen minutes for Hall and eighteen for Flinn.

Numerous physicians have located their practices in the East Bakersfield area. Distance to this portion of the city from the project site is about ten miles.

ARCHAEOLOGY/HISTORY

During the Paleozoic period, there lived "a prolification of swimming, creeping things," and the "site of the Sierra Nevadas was a marginal sea bottom."[3] During the Jurassic Age, the Sierra Nevadas were formed by either a lifting or intensive action. At the close of the Cretaceous period, a shallow sea covered the valley to the base of the mountains. Mud flowing from the mountains formed

---

1 Located at 1003 Niles Street, Bakersfield

2 Located at Mt. Vernon Avenue and Oregon Street, Bakersfield

3 Miller, Thelma B., History of Kern County California, Volume 1, 1929

a breeding ground for many marine animals, notably whales and fish, including the great sharks. This sea life contributed to the petroleum deposits abundant in the area as the valley was formed by the dropping of the coast, which bowed up the bordering mountain regions, burying the remains under a series of sediments and alluvial fans.

The presence of the fossilized remains of marine life is very evident by the findings on Shark Tooth Hill, four miles northwest of the project on the north side of Kern River.

Construction of the campground aroused some concern with local museum officials because fossil beds were reported in that area along the river front. Investigation, as reported in the January 4, 1973, issue of the Bakersfield Californian, revealed that "no evidence of marine or amphibian vertebrate fossils" was found.

The Yokut Indians lived throughout the general area along the Kern River. It is to be expected to find an occasional tool, flake, or projectile point almost anywhere in the area. Such remnants have been found on or near the project property. In addition, there are several large Indian village sites within a mile of the immediate area. Therefore, it is suggested that although no evidence of occupation has been found in the immediate area, individuals passed through the area frequently en route elsewhere. Local populations may have hunted and gathered in this area as well.[1]

An archaeological survey was conducted of the project area by Robert Schiffman in order to locate and assess any archaeological materials that might be present there. No archaeological sites were found, although several unassociated

---

1 Schiffman, Robert. See report in appendix.

flakes of chalcedony and one unassociated hand tool were found. It is not believed that these finds were part of a larger assemblage. The only factor that could have affected the findings of the current survey was the grass covering over most of the project area. It is possible that the grass could have obscured additional flakes and any soil coloration changes. Judging from the terrain, its location, and the lack of any larger tools, the probability of uncovering additional materials is low.

The Spanish, and namely Francisco Garces, were the next visitors to the area. Garces mingled with the Indians as he taught them, and he discovered the Rio Bravo--later the Kern River--near the mouth of the canyon with their aid. Garces' successors, the Spanish soldiers, Mexicans, and the white men from the east, led to the demise of the Indian residents in the valley.

DEMOGRAPHICS

The present population of Kern County is estimated to be 345,800. Population centers are located in the western half of the county in three communities over 10,000 people, Bakersfield (76,525), Delano (15,200), and Taft (12,050). Kern County's population by 1980 is estimated to be 360,000 (U. S. Bureau of Census). In 1975 the county population distribution was 89.0 percent urban and 10.0 percent rural[1] (Kern County Planning Department). An age breakdown of the county's population indicates the following: 0-4 years old, 9 percent; 5 to 19, 32 percent; 20 to 64, 52 percent; 65 years and older, 7 percent (U. S. Census of April 1, 1970). The median age for the county is 25.9 years.

---

[1] A rural community is defined as having less than 1,000 residents.

Presently the economic base of the area is fairly diversified. Major employment areas are shown in Table XI.

TABLE XI

NONAGRICULTURAL WAGE AND SALARY AND AGRICULTURAL EMPLOYMENT[1]
KERN COUNTY

	1975	1974		
	January	December	November	January
Nonag wage and salary workers c/	101,000	102,100	102,200	97,600
Mineral extraction	7,300	7,300	7,300	7,300
Construction	3,800	3,800	4,100	3,900
Manufacturing	9,200	9,200	9,200	8,800
Durable goods	4,500	4,500	4,500	4,500
Nondurable goods	4,700	4,700	4,700	4,300
Transportation, communication, and utilities	6,600	6,700	6,800	6,200
Trade	23,900	24,600	24,000	23,000
Wholesale	4,400	4,500	4,500	4,400
Retail	19,500	20,100	19,500	18,600
Finance, insurance, and real estate	3,800	3,800	3,800	3,900
Services	17,500	17,700	18,000	16,800
Government a/	28,900	29,000	29,000	27,700
Total agricultural employment b/	18,700	19,900	19,100	15,800

a/ Includes all civilian employees of federal, state, and local governments, regardless of the activity in which the employees are engaged

b/ Includes farmers, employees, and unpaid family workers

c/ Employment reported by place of work, excluding workers in labor disputes

d/ The nonagricultural wage and salary employment has been revised as of this month to reflect the new March, 1974, benchmark information. This change has also resulted in revised labor force figures

[1] Source: Southern California Employment Data and Research

Seasonal adjusted unemployment rate was 6.6 percent in January, 1975. The following table shows the unemployment rates for the last four (4) months.

TABLE XII

LABOR FORCE, EMPLOYMENT AND UNEMPLOYMENT
KERN COUNTY

	1975	1974		
	January	December	November	January
Civilian labor force a/	141,800	143,600	142,400	132,900
Total employment	132,000	134,300	133,000	125,800
Total unemployment	9,800	9,300	9,400	7,100
Seasonally adjusted rate	6.6	7.3	7.2	5.1
Unadjusted rate	6.9	6.5	6.6	5.3

a/ Total labor force (and components) by place of residence and including workers involved in trade disputes. Employment includes self-employed, unpaid family, and domestic workers.

The 1975 overall median family income in Kern County was $12,380 (Kern County Planning Department).

ECONOMICS

Project site is located within tax rate area code 056-004 and has an assessed valuation of $79.99/acre for 138[1] acres; the total land assessed valuation is $11,038.62, for a total tax contribution of $1,112.79. See Table XIII for a breakdown of tax contribution by category.

[1] Includes the condominium unit, subdivision unit, and undesignated area between County Road 711 and northern boundary of condominiums.

TABLE XIII

1974-75 TAX RATES - COUNTY OF KERN
(Area Code 056-004)

			Rate	Contribution Tax
Bakersfield Outside				
Secured Valuation	Gross	$5,136,420		
Homeowners' Exemption		6,610		
Business Inventory Exemption		8,450		
	Net	$5,121,360		
Unsecured Valuation	Gross	$ 388,710		
Business Inventory Exemption		4,740		
	Net	$ 383,970		
County			3.0286 x $11,038.62	$33,431.56
County Advertising			0.0090 x 11,038.62	99.35
Road			0.0000 x 11,038.62	----
Fire			0.7217 x 11,038.62	7,966.57
County Service Area 12.1			0.0524 x 11,038.62	578.42
Kern Mosquito Abatement District			0.1000 x 11,038.62	1,103.86
Kern County Water Agency			0.0395 x 11,038.62	436.03
Bakersfield School Bond			0.1248 x 11,038.62	1,377.62
Kern High School Bond 5			0.1070 x 11,038.62	1,181.13
Bakersfield School Maintenance			2.6659 x 11,038.62	29,427.86
Kern High School Maintenance			2.2691 x 11,038.62	25,047.73
Kern Community College			0.7002 x 11,038.62	7,729.24
Education			0.1133 x 11,038.62	1,250.68
Development Centers for Handicapped Minors			0.0177 x 11,038.62	195.38
Juvenile Hall Schools			0.0072 x 11,038.62	79.48
Education of Juvenile Court Wards			0.0199 x 11,038.62	219.67
Educated Physically Handicapped - Elementary			0.0596 x 11,038.62	657.90
Educated Trainable Mentally Retarded - Elementary			0.0059 x 11,038.62	65.13
Educated Trainable Mentally Retarded - Secondary			0.0149 x 11,038.62	164.48
School Equalization Tax			0.0242 x 11,038.62	267.13
		TOTAL	10.0809	$ 1,112.79

HOUSING

General housing characteristics for Kern County and Bakersfield are listed in Table XIV. Bakersfield area includes Local Statistical Area (LSA), which is shown on the LSA map for Kern County on the following page. Bakersfield has approximately 65,000 housing units; of these units 38,722, or about 59.5 percent, were owner occupied.

The number of dwelling permits issued in Kern County and Bakersfield is presented in Table XV.

TABLE XIV

1975 ESTIMATED GENERAL HOUSING CHARACTERISTICS FOR KERN COUNTY AND BAKERSFIELD[1]

	Kern County	Bakersfield[2]
Total population	345,800	186,800
All housing units	132,250	65,000
Population in housing units	338,870[3]	183,056
Occupied housing		
Housing units	112,650	62,750
Per occupied unit	3.01	2.92
Owner[4]	67,027	38,722
Renter[4]	45,623	24,028
Vacancy status		
For sale only	1,000	500
For rent	3,600	1,750
Other vacant[5]	15,000	720
Total housing vacant	19,600	2,250

[1] Source: Kern County Planning Department

[2] Bakersfield includes Local Statistical Area 11, which is Census Tracts 1.01 through 31.03

[3] 6,930 Kern County residents lived in group quarters and were not included

[4] Assuming a housing mix of 59.5 percent owner occupied

[5] Housing and 40.5 percent renter occupied housing from 1970 U. S. Census. The greater majority of other vacant is comprised of vacation homes

TABLE XV

NUMBER OF DWELLING PERMITS ISSUED
IN KERN COUNTY[1]

	1970	1971	1972	1973	1974
Kern County	2753	2384	3644	2882	3003
City of Bakersfield	722	563	1416	530	453
Types of dwelling units					
Single family	301	267	347	280	434
Duplexes	38	23	7	17	59
Apartments	111	114	215	114	65

[1] Includes all types of housing units

SECTION III. ENVIRONMENTAL IMPACT

III-A. THE ENVIRONMENTAL IMPACT OF THE PROPOSED ACTION

VISUAL

The natural visual components of the site will be reduced by the project. The proposal will require grading of the site that will eliminate the natural "rolling hill" quality of the area. Extensive modification of landscape, including construction of residences and roadways, will further reduce the visual aspects. Nonresidents utilizing the various county park facilities will pass an urban type development en route to such facilities. The surrounding lands could be affected by the proposed project as well. Increased usage of the Kern River County Park, Lake Ming, and golf course could reduce the visual influence due to greater activities and possible accelerated denuding of land from foot traffic and possible off-road vehicles. The increased populace could cause a greater potential for wildfire on the undeveloped area, thereby reducing the visual impact of the area.

TOPOGRAPHY AND GEOLOGY - SEISMOLOGY

Grading of landscape to create building pads for condominiums and subdivision will be performed. Applicant's representative estimates amount of earth to be moved is between 60,000 and 80,000 cubic yards. This would be approximately 700 cubic yards of cut (or fill) per acre. Maximum cuts could be 15 feet; the average may be about 8 feet. Maximum fill slopes 3:1 or flatter could be 30

feet, with average fills throughout the project being 10 to 20 feet high. Extensive grading will probably be only in the condominium area and could include roads, lakes, and building site grading. Engineering and grading time, expense, and energy will be committed to topography alteration. Exaggerated landscape will be fabricated to replace the natural terrain on site. This landscape may not be visually compatible with surrounding topographic features.

Project should affect only "surface geology" on site, as only surface alluvium should be disturbed.

Proposed project is located in a seismically active area in which a Modified Mercalli (MM) earthquake intensity of IX can be anticipated.[1]

CLIMATE AND SURFACE HYDROLOGY

Construction of paved areas, structures, and landscaping may raise ambient temperatures on site by about 1.0 to 1.5° F above present annual mean; 2.0 to 3.0° F above winter minima. Relative humidity annual mean could be decreased during winter by 2 percent. Radiation (solar) receipts incident upon a horizontal surface might be reduced approximately 10 percent. Dust particles in the atmosphere at the site could increase as much as 10 times the present amount during and after construction before bare ground becomes vegetated again. Wind speeds due to structures could be decreased as much as 25 percent (annual mean) and extreme gusts curtailed by 15 percent. Periods of calms should increase by 10 percent.[2]

[1] Feder, Harry R., Engineering Geology Proposed Rio Bravo Tennis Ranch, 1973

[2] Interpolated from: McBoyle, Geoffrey, Climate in Review, 1973

The potential of increased runoff could be initiated as soon as grading on site begins. Effects on runoff will become evident because of settlement and ancillary features such as roads, pavements, and altered landscape. Infiltration capacity may be considerably reduced; precipitation will be caught by rooftops and roads and will be passed through drainage systems which have been designed to dispose of it into Kern River as rapidly as possible. The result could be a rapid buildup of surface runoff which will be accentuated where slopes are steep.

Soil moisture content will be increased by development. When soil moisture content is high, as after a period of high rainfall or low evapotranspiration, infiltration capacity is low so that surface runoff is encouraged, while any rainfall which does infiltrate will tend to percolate directly to groundwater. In this way, total runoff from subsequent precipitation is likely to be very high, whereas after a period of high evapotranspiration and low rainfall, both the infiltration capacity and soil moisture deficit are high, so that even intense rainfall rarely produces a substantial increase in runoff.

Calculations from the 190-acre catchment of the project show that over 17 acre-feet[1] of runoff could occur in or about the month of February if infiltration capacity is at a minimum. Structures, pavement, and landscaping could increase the potential of the catchment's infiltration capacity being at a minimum condition during periods of heavy precipitation.

Applicant's representative reports:

> "Runoff water could carry nutrients and pesticides onto downstream lands and the Kern River, but the impact is estimated to be negligible. Runoff will occur mainly in the winter months, while fertilization and the

---

[1] See appendix for calculations

use of pesticides will occur in the summer months. Commercial fertilizers (usually ammonium sulfate) are irrigated into the soil after application and are then fixed (held) by the soil. This occurs immediately after application. Some constituents of pesticides do remain for a long time, but they are applied in low concentrations. The chances of storm runoff water having even a concentration as low as 1 to 2 ppm of fertilizers and pesticides are remote and even these would probably dissipate on the land intervening the project and the lake and river.

"Storm runoff water would be turbid and possibly transport materials to the lake and river and the intervening land."

In conclusion to surface hydrology impacts, examination and discussion of all cause and effect relationships related to development in the specific plan area would require much more technical and extensive text. Highlights and extreme events were only discussed above.

GROUNDWATER

Leachate from proposed sewage seepage pits and leach fields will percolate to aquifers. This flow, estimated by the applicant's representative, could be approximately 72,000 gallons per day (80 acre-feet per year) under ultimate development.

Structures, pavement, and irrigated landscape will reduce meteoric water percolation to groundwater (increase runoff).

Assuming the amount of precipitation is less than potential evapotranspiration year-round at the site, no meteoric water presently reaches groundwater aquifers. Using the general assumption that one-third of the proposed project will be landscaped and the applied water for irrigation could be five acre-feet per year, the amount of water to percolate would be: Supply precipitation = 16.15 cm/year x 190 acres = .53 acre-feet/year x 190 acres = 100.6 acre-feet/year.

Supply applied = 190 acres/3 x acre-feet/year = 253.3 acre-feet/year. Potential evapotranspiration = 108.8 cm/year = 4.3 acre-feet/year x 190 acres/3 = 272 acre-feet per year. Supply total = (supply precipitation + supply applied) x runoff factor where total runoff factor = 30% runoff, which would be .70 retention. Supply total = (100.6 + 253.3) .70 = 248 acre-feet/year. Percolation = supply (-) potential evaporation = 248 acre-feet/year (-) 272 acre-feet/year = 0 acre-feet/year.

It is concluded that percolation should come only from 80 acre-feet per year leachate flow if water applied (irrigation and meteoric) to landscaping is maintained at or below the potential evapotranspiration rate throughout the year and runoff is above 30 percent. Runoff will either be allowed to flow off site or be held in catchment-retention ponds. If these ponds are not sealed completely, then percolation from those ponds will be in addition to the 80 acre-feet per year leachate flow.

SOILS

Since all infiltrating water must pass through the soil surface, the condition of the latter will obviously exert an important influence both on the rate of infiltration and on the infiltration capacity. Indeed, in many cases soil surface conditions impose an upper limit to the rate at which water can be absorbed, despite the fact that the capacity of the lower soil layer to receive and to store additional infiltrating water remains unfilled.

In the absence of a vegetation or crop cover, falling raindrops may so compact the surface of the soil that infiltration is rapidly and effectively reduced. This effect is more noticeable on clay soils, which can be rendered virtually

impermeable in this matter, than on clean sandy soils, which are much less susceptible to rain compaction.

Fine particles brought to the surface by grading and carried in suspension by infiltrating water may clog pores in soil surfaces and so lower infiltration rates.

On steep slopes, water moves rapidly over the surface, allowing little time for infiltration, whereas on gentle slopes or flat surfaces, water either moves slowly or is ponded back, thereby encouraging higher totals of infiltration. Therefore, the effects of grading may be either to increase or to decrease the infiltration capacity. Almost inevitably, for example, the grading of natural or long-established vegetation surfaces (such as found on project site) results in a reduction of infiltration capacity.[1]

A vegetation cover tends to increase infiltration in comparison with areas of bare soil, not only by retarding surface flow, so allowing more time for water to enter the soil, but also by shielding the soil surface from the direct impact of raindrops, thereby reducing surface compaction. Furthermore, the development of complex root systems increases permeability of surface layers, encouraging more rapid passage of infiltrating water.

A major factor affecting Rio Bravo catchment area is the proposed spread of buildings and paved surfaces over it. This will significantly contribute to the frequency of high runoff peaks and potential severe soil erosion in and

---

[1] Mitchelson, A. T. and D. C. Muckel, Spreading Water for Storage Underground, U.S.D.A. Tech. Bull. No. 578, 1937; and Musgrave, G. W., How Much of the Rain Enters the Soil?, U.S.D.A. Water Yearbook, McGraw-Hill, 1955

around the plan area. Furthermore, although surface soil tends generally to be more permeable than subsoil, this is not always the case and, in fact, any one soil horizon may limit the overall transmissibility of the complete profile.

A-zone soil horizons on site contain silty medium-fine sand and significant amounts (in some areas) of diatomaceous earth. This type of soil is highly susceptible to becoming (if it has not already) totally impervious, which may cause a considerable increase in runoff if corrective measures are not exercised immediately after natural vegetation is stripped from the area and proposed cuts and fills are made.

Potential erosion conditions will exist on and downstream from the project site during grading. After grading, potential erosion conditions will persist upon undeveloped lots which have been disturbed by earthwork until revegetation takes place. This period during which lots, pads, streets, etc. have been graded and not yet revegetated or paved should be the most critical regarding impacts to project site and surrounding area soils and surface water quality and quantity. Several years could pass before vegetation on grading sites would occur as it is not established if left to natural propagation time span.

VEGETATION

The construction of the project will remove the native and indigenous vegetation from the site and replace it with structures, paving, and landscaping. Undesirable plants, such as tumbleweed or Russian thistle (*Salsola kali*) will tend to move into denuded building sites and road cuts and will prevent regeneration of native plant species in these areas.

There could be a secondary impact on off-site vegetation due to potential increase in runoff (see Climate and Surface Hydrology), which could result in erosion and sedimentation downstream, thereby causing loss of some native vegetation. In addition, such runoff could carry excess nutrients, pesticides, and herbicides used at the project site downstream, causing possible accelerated growth rate of native plants and possible destruction of some plant materials from poisons.

Inclusion of some nonnative plant in the proposed project landscaping could cause an introduction of undesirable flora on the surrounding undeveloped land. As an example, use of common bermuda could cause the proliferation of that plant by seed onto adjoining land, which could eliminate native vegetation due to the dense growing habit of bermuda.

There will be a greater potential for grass fires as a result of a greater use of roads in the area and because of the presence of more people.

WILDLIFE

Native wildlife will be affected by construction and occupation of the previously uninhabited area. The animals, including those most undesirable, the rodents, will be forced to relocate to adjoining property or expire. Birds will be temporarily relocated; however, some will return to inhabit and feed on the vegetation introduced by the project.

The question as to the ability of the adjoining lands to support displaced wildlife is a valid consideration. This issue is treated in the biotic analysis by George Lawrence, PhD. On-site field studies have determined that

many of the existing wildlife species are nonnative, and the previous grazing impact has allowed the introduction of many Asiatic or European species of plants. The absence of any of the native plants or animals on California's rare and endangered list of wildlife species tends to support the conclusion that biological impact will be minimal. Adjoining lands to the site have been developed in such as way to enhance the wildlife habitat for both migratory and native wildlife species. Both the Lake Ming site and the Kern County Park site are examples of developments that have increased habitat diversity and, therefore, have made available a variety of habitat conditions for wildlife in the area.

It can be expected, however, that prior visits to the area by the San Joaquin kit fox will be eliminated, since food supplies for that animal will be removed from the site or reduced.

There could be a proliferation of domestic animals in the undeveloped areas, especially the common cat, which could cause excessive pressures on the food chain in these areas.

AESTHETICS

Architectural design of the project could have an effect on the aesthetic quality of the area. As an example, excessive grading could reduce or eliminate the natural rolling quality of the undeveloped site. The introduction of structures could further reduce this quality. Low, rambling structures would tend to have a lesser impact, since buildings would not seem to be an unplanned placement on the landscape, whereas multistory structures would appear to "loom" over the existing public facilities and cause an imposing status thereon.

ILLUMINATION

The addition of 280 dwelling units will cause an increase in night illumination from three sources: protective street lighting, residential lighting, and motor vehicle headlights. This will cause the greatest impact on the campground, from where some urban improvements will be directly observed, while the development area will appear as a "glow" on the hills southerly of the campground. This will cause a reduction in the isolated atmosphere normally related to camping areas.

AIR QUALITY AND NOISE

Air Quality -- The proposed project will affect air quality in the following ways:

1. The influx of approximately 280 families to an area that previously had none will generally degrade ambient air quality at the project site. Degradation of air quality will be the result of motor vehicle usage and generation of dust.

2. The project generally represents a relocation of residents within the Bakersfield area, while a significant increase in emission of pollutants is not expected within the San Joaquin Valley Air Basin. An increase will evolve because of the greater number of miles that will be traversed between Bakersfield and the site.

3. The proposed project will cause an increase in motor vehicle traffic between the site and Bakersfield over that which now exists. This increase in vehicular traffic may degrade to a small degree the ambient air quality of the project area.

Noise -- The proposed housing development should have no significant acoustical impact, since it is located in a generally isolated area. However, the net exposure of people to noise will be significant due to the existing location of recreational uses near the site. (For further discussions concerning nearby noise sources, see the March 20, 1975, memorandum from the Kern County Health Department included in the Appendix.)

TRANSPORTATION

The proposed project will increase traffic on roads in the area and accelerate the need for additional widening of such roads. With a development separate from existing urban development, the amount of vehicular travel to the built-up area can be expected to be in excess of that in the urban area. Assuming an average four round trips per day[1] (or eight trips per day over the same road) for each of the ultimate 280 dwelling units, the increased ADT on Lake Ming Road can be expected to be 2,240 vehicles. The following traffic counts can be expected on Alfred Harrell Highway:

Existing ADT	50% each way ADT	100% one-way ADT
900	2,020	3,140

Assuming an average trip is 15 miles (mileage to downtown Bakersfield), the total average daily vehicular miles would be 41,100 miles, while the yearly total would be 16,826,500 miles. The state average accident rate per one million vehicle miles is 5.28 with a severity rate of 1.56. The project could result in a potential 88.84 accidents yearly with a severity potential of 26.25 yearly along the 15-mile route.

The 16,826,500 miles per year would result in a potential consumption of 1,121,766 gallons of gasoline per year, or 3,073 gallons per day, assuming an

[1] D. Jackson Faustman, Consulting Traffic Engineer, "Traffic Analysis Tejon Ranch Lake," September 23, 1972

average gas consumption of 15 gallons per mile. (These figures do not include use of the tennis club, which is assumed to continue operation regardless of the decision on the subject project.)

There could be a demand for public transportation which would result in the relocation of existing bus routes or possible need to purchase additional buses. Assuming three round trips daily (8:00 a.m., 12:00 noon, 5:00 p.m.) with the average trip being 15 miles, a single bus would travel 90 miles per day, or 32,850 miles per year. At an average diesel consumption of 8 gallons per mile, this would result in a daily consumptive rate of 11+ gallons and a yearly rate of 4,106+ gallons. Golden Empire Transit reports the nearest bus stop is at Niles Street and Morning Drive, about 5 1/2 miles from the project site. The site itself is outside the transit district's boundaries. Individuals would either have to walk or ride to Niles Street and Morning Drive to utilize the public transportation.

There will be an increase in need for school bus transportation for the approximately 260 additional elementary, junior high, and high school aged students. The Kern County Transit Company, handling bus transportation for the county, reports its buses have capacities of 16, 36, 48, and 54 students. Using these capacities, the need for as many as 16 buses holding 16 passengers to as few as 5 buses for 54 passengers could be required. Assuming all students would attend Eissler Elementary, Chipman Junior High, or Highland High Schools, the total distance traveled could be 24+ miles per day per bus, or:

	Daily	Yearly (200 days)	Fuel @ 8 miles/gallon/year
5 buses	122 miles	22,420 miles	2,802+ mpg/year
16 buses	390 miles	78,144 miles	9,768+ mpg/year

This need for school bus service could require need for purchase of additional buses. In addition, during inclement weather there could be an impact on the children who must meet at a central location and await the school bus.

There will be a need to accommodate the additional vehicles in the area with parking spaces. The Kern County Zoning Ordinance requires two parking spaces per dwelling unit. While this might provide area for each residence, there will be need for visitor parking. Assuming 2.5 spaces per dwelling unit, the condominium portion would require 500 spaces, while the conventional subdivision would require 200 spaces. Without adequate parking, there could be an increased accident potential within the project area due to possible inconvenience of visitors.

DRAINAGE

Various natural drainage courses on site will be altered; others will be employed by the proposed development's drainage system and may overflow or incise more rapidly because of greater peak runoffs.

PUBLIC SERVICES AND UTILITIES

When the proposed project has reached maximum occupancy, it may require approximately 1,400,000 kilowatt-hours per year. This could result in an increased use of irretrievable resources for those fossil-fueled electrical power plants that would, in part, provide electricity to the site.

Electricity will be delivered through an underground 12 Kv distribution line. To place the line underground, a trench approximately four (4) feet in depth and one (1) foot wide would be dug from the southerly portion of Rio Bravo Tennis Ranch lateral to and throughout the condominium and subdivision units. This could increase the amount of sedimentation being deposited in Lake Ming and Kern River, if these activities are performed during the winter months.

Telephone lines will be placed underground and require trenching to proposed electrical trenches, where "common" trenching will be utilized. Similar sedimentation effects will result, but to a lesser degree than those previously mentioned in this section.

Disposal method of effluent, septic tank systems, could result in increased degradation of Kern River water by additional nitrogen, phosphates, and pathogenic materials. This would increase the eutrophication rate of Lake Ming and chances of human contraction of communicable diseases.

Solid wastes from construction and human habitation would probably be disposed of at the City of Bakersfield sanitary landfill. This would decrease the life expectancy of the disposal site. Assuming 2.8 pounds of solid waste are generated per resident per day, or 470 tons per year, solid wastes from human habitation would decrease the life expectancy of this disposal site by three days.

The proposed project will create a need for increased or additional public services. The Kern County Sheriff's Department has indicated that the proposed project will create the need for one additional deputy and vehicle for patrols. Discussion with Kern County Fire Department personnel indicates that present facilities are adequate to service the proposed development.

The proposed project will add a permanent population to the area of approximately 920 people. Of the existing facilities in the adjacent Kern River Park, these people would tend to use the golf course and Lake Ming for boating. This use may be higher than average due to proximity, but probably only to the golf course. The project's population probably would not use the campground at all, and their use of the picnic grounds would not be increased due to their proximity.

The Olcese Water District has constructed a water system to serve the project. The system is described in the previously mentioned report on "The Kern River-Olcese Water District." The proposal would require additional amounts of water to be diverted from the Kern River.

SCHOOLS

Because of the present high cost of housing, a trend has been established toward purchase or renting of condominiums by age brackets generally young enough to have school age dependents. Studies in Southern California reveal average occupation of condominiums has been 2.7 persons per unit.[1] To compensate for the established trend toward greater occupancy loads through time, 3.0 persons per unit is used for this report (1 student per unit). Subdivision homes could be occupied by an average of 4 persons per unit (2 students per unit).

Proposed maximum student population could be:

200 condominiums x 1 full-time student/unit	=	200
80 subdivision lots x 2 full-time students/unit	=	160
Total	=	360 full-time students

A possible breakdown could be:

	Full-time	Part-time (night school)
Elementary	80	--
Junior high	80	--
High school	100	5
Community college	65	40
State college	35	10

An additional three elementary school classrooms and three junior high school classrooms may be required to accommodate respective increases of students due to proposed project.

Indications have been made that there should be no severe impact upon Kern High School District due to the tentatively proposed additional 100 students. Kern High School District will provide bus transportation to place students

[1] Information submitted by applicant's representative

in schools which have available space. No commitment has been made by the District for any one of its schools. Also, the school or schools assigned would be subject to change.

Both colleges in the project's region, it would appear, have ample space for projected demands.

The greatest impact which should be considered is the amount of energy consumed in transporting all students to and from school. This impact is discussed in the Transportation section of this report.

HOSPITALS AND OTHER MEDICAL FACILITIES

No impact of the proposed project upon medical facilities is foreseen. Population growth of Bakersfield Urban Influence area should not be fostered by proposed project. Transportation time, especially in emergency situations, to medical facilities in Bakersfield must be considered adverse in light of the possible 20 minutes[1] which an emergency patient must wait to arrive at Kern Medical Center for emergency treatment once the call to an ambulance service is placed.

ARCHAEOLOGY/HISTORY

It is not anticipated that the project will have any effect on any historical or archaeological resources because there are no known archaeological sites of any archaeological significance on the project, and any known sites are

[1] 18 minute round trip for Flinn Ambulance plus 2 minutes boarding time at patient's residence

removed from the project area. Only surface alluvium to a minimal depth will be disturbed, and any paleontological fossils encountered would have been displaced from remote areas.

ZONING AND LAND USE

The proposed project is in conformance with the Land Use and Open Space-Conservation Elements of the General Plan. However, the Bakersfield Metropolitan Area General Plan (1961) envisioned this area as being recreational.

The proposed zoning of R-1 P-D is compatible with the proposed condominium and subdivision projects.

DEMOGRAPHICS

Project could provide positive impacts on the unemployment rate by temporarily employing construction work force for approximately 590,000 work hours. See appendix for a complete breakdown by category and estimated work hours. Also, the project will employ approximately 78 full-time employees in permanent support-related jobs.

ECONOMIC

Proposed project will have both positive and negative economic impacts on the Bakersfield Metropolitan Area. See Cashflow Summary following this page.

Some of the positive impacts include:

TABLE XVI

CASHFLOW SUMMARY[1]
FOR PROPOSED RIO BRAVO SUBDIVISION-CONDOMINIUM DEVELOPMENT
1977 through 1986

Year	County Revenue	County Operating Costs	County Surplus/ (Deficit)	Local School District Revenue	Percentage of School District[2] Operating Costs Paid by Local Taxes	School District Surplus/ (Deficit)	Composite Surplus/ (Deficit)
1977	$ 86,164	$ 15,594	$ 70,570	$ 71,218	$ 82,581	$(11,363)	$ 59,207
1978	122,870	15,864	107,006	123,298	120,496	2,802	109,808
1979	149,699	18,179	131,520	160,651	146,692	13,959	145,479
1980	149,699	17,619	132,080	160,651	146,692	13,959	146,039
1981	149,699	17,619	132,080	160,651	146,692	13,959	146,039
1982	149,699	18,559	131,140	160,651	146,692	13,959	145,099
1983	149,699	18,020	131,679	160,651	146,692	13,959	145,638
1984	149,699	17,899	131,800	160,651	146,692	13,959	145,759
1985	149,699	17,619	132,080	160,651	146,692	13,959	146,039
1986	149,699	17,619	132,080	160,651	146,692	13,959	146,039
TOTAL	$1,406,626	$174,591	$1,232,035	$1,531,246	$1,376,613	$103,111	$1,335,146

[1] Statements of municipal operating costs and revenues are in appendix on pages 205a and 206a

[2] Kern County School District's Finance and Personnel Statistics, 1974-1975

1. A temporary increase in regional income from construction payroll totaling $7,000,000. This annual payroll could result in additional regional income of approximately $1,400,000[1] which is generated by construction payroll spending in the area. This total regional income would then temporarily increase dollars spent on retail sales by approximately $3,360,000.[2]

2. A permanent increase in regional income in the amount of $180,000 per year for maintenance payroll. This will also increase in additional regional income of $36,000.[3] This income would permanently increase dollars spent on retail sales by $86,400.[3]

3. The expenditure for sand, gravel, lumber products, paint, and asphalt will amount to $2,315,000.[4]

4. Project would appear to contribute a minimum net profit of $59,207 in any one year to Kern County.

The one negative impact would appear to be that the project's local tax contribution would appear to be lower than the 1973-1974 percentage for Kern High during the first phase of development. School district surplus would be apparent in the latter years of development, assuming that property tax delinquencies for the development are nonexistent.

---

[1] See table entitled "Additional Regional Income From Construction of Condominium and Subdivision Project" in appendix

[2] See table entitled "Additional Retail Sales and Sales Tax Revenues Resulting From Construction Activities for Proposed Condominium and Subdivision Development" in appendix

[3] Used similar assumption for calculations of regional income and retail sales as used in References 1 and 2 for maintenance payroll

[4] See table in appendix entitled "Estimated Material Requirement Costs" for the project, valued in dollars

III-B. MITIGATION MEASURES PROPOSED TO MINIMIZE THE IMPACT

VISUAL

There is no mitigation measure that would prevent a visual impact on the area other than no project.

TOPOGRAPHY AND GEOLOGY

Grading and erosion control methods should be engineered and under Kern County design review and inspection by the Kern County Grading Ordinance and grading permits.

Any structures on the property should be designed to resist a Modified Mercalli intensity earthquake of at least IX.[1]

CLIMATE

The potential for the project to have adverse effects upon the mesoclimate of the region (except the growth-inducing-related impacts, which are very subtle) appears to be minimal. Roofs, streets, water, and other proposed surfaces should balance any potential adverse albedo change on site. The reverse--effects climate may have upon the project--has more significant consequence. Adverse effects of climate upon proposed project design cannot be mitigated to any great degree without an alternate design's being introduced.

---

[1] Suggested by Harry R. Feder, Engineering Geologist, Engineering Geology, Proposed Rio Bravo Tennis Ranch, 1973

Mitigation measures to employ climatic conditions for beneficial uses should be considered. South- and west-facing windows should be shaded by some means of louver configuration which would admit solar energy during low angles of incidence (winter) and would reflect solar energy during high angles of incidence (summer).

It has been proven in recent tests that swimming pools painted dark colors (the darker the better) maintain water temperatures as much as 10 degrees Fahrenheit higher than conventional pool colors; e.g., light blue.

Parking areas should be roofed to reduce energy consumed during hot days for air conditioned auto "cool-down" periods.

Landscaping techniques which enhance energy conservation in areas of heating and cooling through structure orientation, fenestration, and use of shade should be incorporated into project design.

SURFACE HYDROLOGY AND GROUNDWATER

Lakes intended for condominium development should decrease peak runoff and regulate overflow to existing drainage channels. Lake eutrophication shall be controlled by maintenance practices set forth by condominium homeowners' association. Lake beds shall be treated to minimize percolation losses.

Good fertilizer and pesticide application practices shall be used to hold nutrients and pesticides in runoff flows at one ppm or less. If runoff flows from completed project prove to contain less than one ppm, then that amount should be established as the standard and concentrations of nutrients and pesticides held at that standard.

Turbidity (siltation, suspension, etc.) in stormwater runoff from proposed project should not be allowed to be in amounts greater than what presently flows from project site.

Runoff control shall be approved by the Kern County Public Works Department.

Water quality shall meet standards set forth by State Water Resources Control Board, as outlined in the Basin 5D Tentative Water Quality Control Plan Report. State Water Resources Control Board has expressed, in Resolution No. 68-16, its intent to maintain the highest quality of water possible to preserve all present beneficial uses. This resolution is known as the State's "Nondegradation Policy." The key provision of this resolution is as follows:

> "Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water, and will not result in water quality less than that prescribed in the policies."

It is the State Board's intent that this provision shall apply to all surface and groundwaters of the State that have an existing or potential beneficial use. Further, it is the State Board's intent that as a general matter, the waters of the State shall not be degraded beyond their present quality by water discharges caused by man's activities.

Septic systems shall be designed to the best practices permitted by the current technology and codes applicable at time of construction. Septic systems shall not degrade soil quality or potential productivity and should conserve energy and use a minimum of land surface.

Waste water shall be placed back into natural water cycle of the environment under the State's "Nondegradation Policy." If above-ground sewage treatment becomes necessary during the life of the project, underground effluent disposal shall be held to standards set forth by State Board. Treated waste water percolating from leaching facilities shall not reach Lake Ming or the Kern River.

Sewage treatment systems shall be monitored and maintained by Olcese Water District.

SOILS

Because the subject plan area is in a moisture deficit region (evapotranspiration far exceeds precipitation), natural propagation of vegetation in areas left bare due to construction will take longer than in a wet environment. Earthwork operations should be phased to allow areas left bare to be reseeded and revegetated to prevent erosion as much as possible. Techniques of soil erosion prevention should be followed as suggested by Kern County Public Works Department and U.S.D.A. Soil Conservation Service, Bakersfield. Mixtures of seed and plant types should be of native materials typical of the plant associations found in the project's region. Amounts of seed per acre, plant size, and/or container size must be specified by developers and verified by the county before application.

Timing is a critical factor in revegetation. It is essential to establish some type of ground cover prior to initial seasonal rains in order to reduce erosion, slides, and soil creep. An example is bank-incisement erosion which was caused by Rio Bravo Tennis Ranch's parking lot runoff.

Failure to maintain soil stability not only inhibits reestablishment of native vegetation, but also adds substantially to project costs (either to the developer or county) through road damage, siltation, and other problems previously pointed out in the impact portion of this section. Certified seed purchased from a reputable company supplies substantial dividends. In particular, it is less likely to contain noxious weed seeds, such as thistles, and usually has higher germination rates.

Developers should map all areas (under the guidance of Kern County Public Works Department's Engineering Geologist) within their project limits which are unstable (high erosion hazard). Developers should take extra preventive measures, as suggested by Kern County Public Works Department and U.S.D.A. Soil Conservation Service, to minimize erosion in any existing unstable areas.

Where earthwork must take place, sufficient soil should be retained and/or replenished to support the vegetative cover. Topsoil should be retained in storage piles to be redistributed upon areas of grading.

Because of the generally moderate fertility of the upper soil horizons (A and B) and the inhospitable nature of fanglomerates created through diagenesis, some fertilization will probably be required in most instances to establish revegetation successfully and rapidly. Whenever practical, only the soil's actual deficiencies should be replaced, using the minimum amount required.

Irrigation might be required to supplement natural moisture until vegetation is established.

VEGETATION

There is no mitigation measure that would prevent an impact on the vegetation of the project site other than no project. The impact of the proliferation of undesirable plant species can be reduced by the use of native plant materials, especially on the fringe (50' to 100') of development.

Immediate revegetation of areas left bare after construction will reduce downstream runoff and siltation which could harm off-site vegetation. Such reseeding should be made using native plant materials in order to reduce invasion of undeveloped land by undesirable (dominant) species of plants.

Efficient maintenance programs, including selective use of fertilizers, pesticides, and herbicides, will reduce downstream effects on native plant life. Only nontoxic or short-lived chemicals should be permitted. An efficiently designed drainage system will reduce downstream despoilation of flora from chemicals used at the project site.

Irrigation of proposed landscape should be held below the potential evapotranspiration (PE) rate throughout the year. See Adverse Impacts section, Groundwater, for computed monthly PE in acre-feet per acre. If automatically controlled sprinkler irrigation is employed, monthly adjustments to application times must be made to keep the varying balance between application rates and PE.

WILDLIFE

To protect the wildlife that might be reestablished on adjacent undeveloped land from disturbance by domestic animals, the developer should seek establishment of a leash law for the project site. While the domestic cat is not normally subject to such laws, the developer should seek alternate controls (e.g., through covenants, conditions, and restrictions) to protect wildlife from cats. (It is noted that restrictions of this type could protect domestic animals from wild animals, as well.)

Planting of trees and shrubs native to the area, including cottonwood, sycamore, and toyon, would aid in reestablishing some avian life that might leave the area during construction.

AESTHETICS

While the natural visual effect of this area will be lost because of the project, the proper design of the project, including plan layout, building materials, building height, and orientation and landscaping, will reduce the aesthetic impact of the project.

1. Site planning - The developer proposes to utilize a meandering circulation plan on the condominium portion of the development. This would appear appropriate, since the topography is one of rolling hills. The layout of dwelling unit clusters should also reflect the terrain by limiting the amount of grading and by providing for cantilevered or split-level units. The conventional subdivision should likewise be designed with large radius curves (minimum 300 feet) and short tangents (maximum 500 feet). "Knuckle" intersections should not be permitted. Maximum open space or common area and interior pedestrian circulation should also be provided. The actual site of each conventional dwelling should be designated and any necessary grading limited to that area in order to retain as much of the aesthetic appeal as possible.

2. Building materials, height, and orientation - Materials with a natural quality, such as exposed wood beams and siding of adobe blocks, and use of earthen hues as coloring will lessen the aesthetic impact and provide a softer view for the observer.

   The height of the structures should be limited by restricting the pitch of the roof to 4:12. This will provide a low profile to reflect the rolling quality of the topography. Roofing materials should be limited to natural wood shake and shingles or adobe tile or other material with an earthen quality.

Structure orientation should be such to take advantage of natural climatic conditions. Large glass areas should not be oriented to the south or west, where intense heat could cause an increase in energy consumption; this would also limit reflection and glare on adjoining dwelling units.

3. Landscaping - The selection in the types of landscape materials for the project will aid in minimizing the impact. Utilizing plants that are native to the area will help create an atmosphere reflecting nearby areas, such as the Kern River.

Some of the more attractive plants which are native to the region and are appropriate as natural landscaping plant choices include the Western sycamore (Platanus racemosa) and Buttonwillow (Cephalanthus occidentalis) as forms of deciduous shade trees. Valley oak (Quercus lobata) could be used as an evergreen shade tree. Among the useful shrub species that could enhance the site are the colorful flannel bush or Fremontia (Fremontodendron californicum) and Western redbud (Cercis occidentalis), which have been established in the metropolitan Bakersfield area as shrubs typical of this part of California. An evergreen shrub which provides both red berries and glossy green foliage is the Toyon, or California Christmas berry (Photinia arbutifolia); this shrub serves also as a source of food for native birds during the winter months.

Plants that would result in a "sharp piercing" of the sky, such as Deodar-cedar or Italian cypress, should be avoided, as the shape is contrary to the natural terrain. In order to blend the size with the adjacent undeveloped area, a 50-foot to 100-foot buffer strip around the site should be required. This area should be seeded with a natural grass and wildflower

mixture. Within the subdivision unit, the steeper hillsides and gullies should remain in the homeowners' association for maintenance purposes and should be landscaped as noted above. (See map following page 100.)

ILLUMINATION

No night advertising signs should be allowed in this development. Since the development is proposed to be private and behind guarded gates, the need for nighttime protective lighting is reduced. Safety lighting for pedestrians may be necessary. If so provided, such lighting should be of a low intensity and should be to human scale (lighting element at 10 to 12 feet above finished grade). Where street lighting is proposed, the intensity of light should be no more than 150 watts. Height of poles should be 20 to 25 feet. Lighting control is needed to reduce the "glow" impact on adjacent public facilities, especially the campground.

AIR QUALITY AND NOISE LEVELS

1. Dust will be controlled by sprinkler irrigating the site prior to construction and by the use of water trucks on the site and haul roads during construction. All roads and parking areas will be paved, eliminating the need for dust control measures upon project completion.

2. Landscaping will lessen particulate air pollution from blowing dust than now produced by the barren land during windstorms.

3. State and federal regulations are operating which should lessen stationary and vehicular air pollution.

4. New state noise insulation standards establish uniform minimum noise insulation performance standards to protect persons within new hotels, motels, apartment houses, and multiple-occupancy dwellings from the effects of excessive noise. These standards require that residential structures located in noise critical areas be designed to prevent the intrusion of exterior noises beyond prescribed levels. In addition, the Kern County Noise Element of the County General Plan provides standards for all residential noise environments.

5. New state standards for power boats prescribe maximum noise standards. These standards do not apply to boats racing or qualifying.

TRANSPORTATION

Provisions must be made to control traffic inside and outside the project area. Within the project, the developer proposes traveled way widths of 30 feet (condominium) and 36 feet (subdivision) constructed of A.C. surfacing and aggregate base. In order to assure maintenance of these roads, a homeowners' association or similar entity must be created by the developer. The width of the streets in the subdivision is sufficient to provide visitor parking; however, off-street guest parking at a rate of 2.5 spaces/unit should be required for the condominiums. (This is based on an assumed 50 feet of street-side parking in a conventional subdivision and in addition to a required 2 spaces/dwelling unit.)

Emergency egress routes must be provided for each of the development units. That route should be a minimum 24 feet and paved to provide egress for residents and ingress for emergency (e.g., fire trucks) vehicles.

A bus stop must be provided within each unit (condominium and subdivision) for public transportation, should it become available, and for school children

using school buses. More than one site per unit may be needed depending on the design and capacity of each bus stop.

Outside the development, the impact of an increased traffic flow should be mitigated by the construction of Lake Ming Road to major highway standards between the site and Alfred Harrell Highway. This should include appropriate left turn lanes and control devices (i.e., signals) where necessary to reduce accident potential. Such improvements should be the responsibility of the developer, who, because of the project, is introducing the additional traffic.

Increased control devices might also be required on Alfred Harrell Highway at Lake Ming Road. Such devices, needed to reduce accident potential, could include acceleration lanes, right-turn lanes, and signals. A flashing light noting "caution - merging traffic" might also be needed on State Route 178 at Alfred Harrell Highway in order to reduce speed on State Route 178, where sight distance is limited due to topography.

Only a users' demand could mitigate the need for public transportation. The transit district's service boundary would have to be increased following demonstration of users' need. The transit district notes, however, that it would not normally service an area so separated from bus routes.

Additional school buses could be purchased to service the project area. Those monies would come from property taxes collected following development.

Other types of transportation methods should be considered for the project area in order to minimize the impact of vehicular traffic. Bicycle paths and pedestrian ways should be made a part of development. The former could be made a part of motor vehicle routes by providing signs along the local streets

indicating "bike route." Pedestrian paths must be provided and should be separated from vehicular traffic. In a private development of the type proposed, such paths could meander through the site and could use a paving material other than concrete (i.e., brick, A.C., decomposed granite, etc.). This design should decrease runoff and enhance percolation. Appropriate warning signs (e.g., "pedestrian crossing") should be provided where such paths and streets cross. International symbols could be used.

DRAINAGE

Surface drainage from tennis ranch and condominium unit of proposed project shall be collected in lakes, with overflows allowed to pass down the existing westerly channel through an existing culvert under the county road bordering west side of proposed project, eventually draining into Kern River. Drainage from subdivision unit shall be designed to follow existing channels and pass through an existing culvert at Lake Ming Road, eventually draining into Lake Ming.

If water quality at discharge points is degraded below present quality, detention basins or other hydraulic devices shall be required per recommendation of Kern County Public Works Department. All drainage courses and hydraulic devices related to surface runoff control shall be kept in good operating condition and free of trash, litter, and excessive silt. Drainage channels should be maintained in a practicable vegetated condition where necessary to combat erosion.

PUBLIC SERVICES AND UTILITIES

All utilities--water, electricity, telephone, and cable television--should be placed in common trenches whenever possible and in such a manner that these utilities are easily accessible for maintenance and/or replacement, if necessary.

Present Fire Department facilities appear to be adequate to serve the project. Fire hydrants and buildings will be constructed and access provided to meet Fire and Building Department regulations to minimize hazard from fires.

The need for additional police protection will be lessened by a security gate on the condominium and subdivision projects, allowing only authorized persons to enter.

Proximity to Lake Ming in itself would not necessarily create a desire among residents to become power boat enthusiasts, although some residents may already be boat owners. In this case, they would probably leave their boats at the marina, which would tend to lessen the impact on launching and parking facilities.

Project residents may walk or bicycle to the County Park facilities, thereby lessening the traffic impact on roads and streets.

The increased energy consumption, such as gasoline and electricity, will be mitigated by state and federal and industry actions and regulations to conserve energy, such as:

1. Current trend toward smaller and lighter cars and more efficient engines to increase gas mileage, thereby reducing consumption.

2. New state energy insulation standards require that all new hotels, motels, apartment houses, lodging houses, dwellings, and other residential buildings which are heated or mechanically cooled shall be constructed to comply with the adopted insulation regulations.

3. Design of condominiums will be such to conserve energy as much as possible to include area limitations, orientation, and thermal design of windows; thermal design of walls, roofs, and floors; shading from landscaping and overhangs; and orientation and general attention to any design methods to conserve energy as much as possible.

4. Design of single-family residences will be reviewed by the Architectural Committee with energy conservation as one emphasis.

SCHOOLS AND MEDICAL FACILITIES

It appears that no mitigation measures can be brought about to reduce the impacts upon schools, institutions, and medical facilities without introducing an alternate project design or siting. (See Alternatives, Section III-D.)

ARCHAEOLOGY/HISTORY

The fact that archaeological finds are not present on the surface does not eliminate the possibility of uncovering such materials during development. If any archaeological materials are located through ground disturbing activities, work crews should halt work until an archaeologist has an opportunity to assess the findings. Work crews should be informed of this.

ECONOMICS

If possible, local material and labor should be utilized to the full extent so that dollars spent on the project can remain in the community for as long as possible.

Because this is a leapfrog development, transportation costs for school aged children should be borne directly by the residents of this community. This would minimize this additional educational cost incurred by this development.

III-C. ANY ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED IF THE PROPOSAL IS IMPLEMENTED

VISUAL

The quality of the area will be degraded by the removal of approximately 117 acres of visual open space and construction of residential units. This will create a visual inconsistency between existing recreational facilities and the project. Most adversely affected will be the visual experience of campers at the recently completed county campground. The intrusion of an incompatible use will adversely affect the area by destroying the isolated nature generally related to campgrounds and by eliminating the open space qualities of the site.

TOPOGRAPHY AND GEOLOGY - SEISMOLOGY

Extensive grading will probably be only in the condominium unit. Engineering and grading time, expense, and energy will be committed to topography alteration. Exaggerated landscape will be fabricated to replace the natural terrain on site. This landscape may not be visually compatible with surrounding topographic features.

Proposed project is located in a seismically active area in which a Modified Mercalli (MM) earthquake intensity of IX can be anticipated.[1]

---

[1] Feder, Harry R., Engineering Geology, Proposed Rio Bravo Tennis Ranch, 1973

CLIMATE AND SURFACE HYDROLOGY

Dust particles in the atmosphere at the site could increase as much as ten times the present amount during and after construction before bare ground becomes vegetated again. This could reduce solar energy receipts incident upon horizontal surfaces by approximately ten percent.

Grading and construction could cause a rapid buildup of surface runoff volumes which may be accentuated where slopes are steep.

A remote chance exists that storm runoff may contain greater than one ppm of fertilizers and pesticides. Storm runoff will probably be quite turbid but would probably dissipate on the land intervening the project and Lake Ming or Kern River.

GROUNDWATER

Structures, pavement, and irrigated landscape will reduce meteoric water percolation to groundwater. Percolation should only come from proposed liquid waste disposal and possible catchment-retention ponds if irrigation of landscaping is held below the potential evapotranspiration (PE) rate throughout the year. PE computed in acre-feet for the proposed project's region is approximately:

Month	PE Ac-ft/Acre
J	.06
F	.15
M	.31
A	.39
M	.56
J	.60
J	.67
A	.61
S	.44
O	.30
N	.14
D	.07
Annual	4.30

SOILS

Grading of project site's soils should result in a reduction of infiltration capacity. Another major factor affecting soils in Rio Bravo catchment area will be the spread of buildings and paved surfaces over it. This will significantly contribute to the frequency of high runoff peaks and potential severe soil erosion.

Potential erosion conditions will exist on and downstream from the project site during grading. After grading, potential sheet erosion conditions will persist upon undeveloped lots which have been disturbed by earthwork until revegetation takes place.

VEGETATION

It can be expected that all vegetation at the site will be removed during grading operations and that only a portion will return in the interim between grading and building construction. The returning flora will eventually be replaced or assimilated into the man-made landscape environment. Off-site vegetation may also be adversely affected because of potential for runoff and siltation from the project area and by increased use of adjacent lands by people who would occupy the development. This would adversely affect vegetation by curtailing the range of plant life.

WILDLIFE

Some wildlife will be adversely affected by the development. Those species that will be able to adapt to conditions of surrounding land will find a greater degree of competition for sustenance than previously. This could

cause a slight weakening of the species. Wildlife could also be adversely affected by domestic animals (i.e., cats, dogs) kept by owners of proposed dwelling units.

ILLUMINATION

Excessive illumination could have an adverse effect on the maintenance and enjoyment of adjoining public uses. Most greatly affected would be users of the county camping facility, where one would be a witness to an evening "glow" from the lighting in the proposed development. This would reduce the isolated nature generally associated with campgrounds.

AIR QUALITY AND NOISE LEVELS

The quality of the air is likely to be degraded adversely during both the construction and occupancy stages of development. While the former is expected to be of a minor nature (see "Mitigations," page 86), the permanent occupants' use of motor vehicles will tend to degrade the existing atmosphere. Should this development be approved, one might expect additional proposals of a similar nature. The cumulative effect of a residential development in an area similar to the site (i.e., a bowl-like shape) could have an adverse effect, especially during periods of inversion.

Future residents of the area may be adversely affected by noises from power boats on Lake Ming (memorandum dated March 20, 1975, from the Kern County Health Department; see Appendix). While this impact may be partially mitigated (see page 87), the noise environment of the future residents can be expected to be periodically adverse. (For further discussions, see the Kern County Noise Element of the General Plan, April, 1975.)

TRANSPORTATION

Private vehicles can be expected to create occasional adverse conditions occurring mainly during the morning hours (7:30 a.m. to 8:30 a.m.) and late afternoon hours (4:30 p.m. to 6:00 p.m.). The greatest adverse effect would occur along the access road to the condominium development and at the entrance to the conventional subdivision. While traffic controls could minimize the impact (see page 87), there will be an increase in vehicles.

DRAINAGE

An adverse impact may occur on existing waterways (e.g., Kern River) if all drainage is deposited in these courses. This could cause a buildup of nutrients, pesticides, and herbicides that would adversely affect vegetation and wildlife.

Various natural drainage courses on site will be altered; others will be employed by the proposed development's drainage system and may overflow or incise more rapidly because of greater peak runoffs.

PUBLIC SERVICES AND UTILITIES

Response time for fire and police services could prove adverse because of the distances that have to be travelled. This could result in additional damage to life or property and would put various units considerable distances (see page 45) from unit stations.

Recreational facilities would be expected to receive additional uses, especially the golf course. This could prove adverse to users who may not be as conveniently located to such facilities.

Should a natural gas line have to be constructed to the site, an additional environmental review would be necessary. This review might result in additional adverse impacts.

SCHOOLS

An additional three elementary school classrooms and three junior high school classrooms may be required to accommodate respective increases of students because of proposed project. Various other proposed developments in the area are also considering the impact upon the same schools.[1] Also, some ongoing developments, such as mobilehome parks in the area and numerous housing developments, will cause growth impacts upon existing school facilities on the east side of Bakersfield. Bussing students to schools other than those considered in the impact section--Eissler, Chipman, Hort, and Compton--may mitigate "primary" impacts upon those schools, but "secondary" impacts caused by time and transportation would become extensive.

HOSPITALS AND OTHER MEDICAL FACILITIES

Transportation time, especially in emergency situations, to medical facilities in Bakersfield must be considered adverse in light of the possible 20 minutes which an emergency patient must wait to arrive at Kern Medical Center for emergency treatment once the call to the ambulance service is placed.

---

1 For example, proposed 260-unit apartment complex at Panorama Drive and Columbus Street

III-D. ALTERNATIVES TO THE PROPOSED ACTION

This section is divided into two basic groupings: I) alternatives to the total action and II) alternatives to various phases of the action.

I. TOTAL ACTION

A. No Project -- If development of the subject property is not permitted as proposed, the site could be retained in its existing condition or could be divided into 6,000-square-foot lots as presently allowed by the existing zoning. Assuming the land would be retained as it presently exists, none of the impacts mentioned in Section III-A would occur, and the land would continue to be a visual component of the adjacent park areas. If development occurred as is permitted by the R-1 zoning, division of land could occur by either parcel map or subdivision. Improvements under the parcel map procedures would be minimal and controlled to the degree of existing development, while development by subdivision would fall under the Type III Subdivision classification. This alternative, by itself (see Alternative II-D), should be rejected, since potential development under an R-1 zone would have fewer controls and create greater environmental degradation than the project.

B. Reduction of Dwelling Units -- This alternative would proportionately reduce the impacts described in Section III-A. It could possibly not decrease the costs required for public services, since the same services would be required for the fewer number of occupants while property tax benefits would be slightly lessened.

C. Alternate Site Layout -- Various methods of site design could be considered utilizing the same projected number of dwelling units:

1. A more dense clustering of condominiums and single-family sites would provide a greater amount of common area. Within the condominium area, this could result in multistoried structures. This should be rejected, since the aesthetic and visual impact on the area would be adverse because of such a structure. The concentration of single-family units, as shown on the following page, should be considered a viable alternative, since it would achieve the objectives but reduce the visual impacts.

2. Developing all property as single-family residential (i.e., no condominiums) would reduce the need for maintenance by a homeowners' association but would eliminate the variety of housing units provided by a mixture of dwelling types.

3. Developing all property as condominiums would reduce the visual impact and provide for a single maintenance entity (i.e., homeowners' association). As noted above, however, this would eliminate the variety of housing units from which to choose.

4. A mixture of condominiums and single-family residences throughout development is a viable alternative that must be considered. If properly designed to allow clusters of condominiums in areas of moderate land undulation (e.g., with single-family units designed as a cantilevered unit in areas of greater slope), this alternative could reduce impacts caused by grading operations, aesthetics, and reduction of open space.

D. Alternate Locations -- Since the project's objective is to provide a condominium development and conventional subdivision, the location of this project adjacent to the built-up area or as an expansion of existing development makes this a viable alternative. Specific alternate locations would have to be explored pursuant to CEQA, but suggested areas would include adjacent to the Bakersfield Country Club, the Highland High School area, or near Morning Drive and East Niles Street.

E. Alternate Location -- The developer also owns property south of and adjacent Alfred Harrell Highway at Lake Ming Road. Development of the project at this location would not reduce impacts substantially except that the visual continuity between the proposed site and existing public uses would be retained. This is a viable alternative.

II. PHASES OF THE ACTION

A. Visual -- In order to eliminate a potential impact on the campground, the alternative of redesign to eliminate viewing the development from the campground is a viable alternative.

B. Runoff -- An alternative type of paving with paving materials that would allow percolation of water on site (e.g., brick on sand, decomposed granite on a sand base, alternate paving blocks and turf) and prevent excessive runoff is a viable alternative.

C. Noise -- Construction of earthen berms or other solid barriers together with heavy use of landscape materials along the northeast portion of development may help deflect and absorb sound from power boats on Lake Ming. This may require additional drainage and soils studies and could cause an adverse aesthetic impact if the berm design is not reflective of the natural undulating character of the site. (See the County Noise Element of the General Plan, April, 1975.)

D. Zoning -- If the "No Project" alternative is selected, then an alternate zone classification should be established to complement adjacent recreational uses. Such zones might include "A" (Exclusive Agriculture), R-F (Recreational-Forestry), or O-S (Open Space). Architectural and site design controls should also be included in order to uphold the integrity of the public and private recreational facilities. A new zone classification might be considered to restrict use to recreational facilities. If this alternative is to be viable, it must be used in conjunction with the "No Project" alternative and may also have to result in a change in the Land Use Element of the Kern County General Plan.

E. Energy -- Alternate energy sources should be considered. Solar energy could be generated by use of solar cells placed on the roof of the structure to be furnished with power. Storage of energy could be by battery(ies) placed inside the structure. Additional ground area would not appear necessary. Solar cells could create an adverse aesthetic impact depending on the design and visibility of the roof units. (See article on page 214a of Appendix.)

F. Drainage -- An alternate means of drainage disposal would be by deep well injection on site. Area would be needed for a detention basin during times of heavy runoff, but such a basin could also be used as common area. Such a well would be needed at each location that runoff would leave the site, or a master drainage system could be designed that would collect all runoff to one site.

III-E. THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Proposed project site recently has served as a sheep grazing area. Typical land use other than grazing has been open space. The open space qualities inherent in project site were first degraded by the construction of Rio Bravo Tennis Ranch. However, a "trade-off" between open space qualities and aesthetically pleasing, well-designed and planned development has been struck. It is difficult to relate to the reader what aesthetics are involved, but the Planning staff agrees that the applicant's time and energy does show in the present development. There is no reason why the proposed project should be of a poorer quality than what has already been built. The only problem as far as the "trade-off" is concerned is the possibility of project degradation through time. Because of the large proposed investment in capital, however, there is no apparent reason why this should happen. Furthermore, under present R-1 zoning, potential impacts upon the site's environment could be more adverse than those foreseen from the proposed project.

Although proposed project may be considered leapfrog development in an urban planning sense, it is hoped that Rio Bravo Specific Plan area and project will set precedence for future growth and long-term environmental enhancement in the Kern River Park area.

Cumulative effects being initiated by this proposed project may be obscure and subtle. Future developments in the immediate area may not be able to proceed because of the nondegradation policies of state and federal government in areas of water and air quality. Laws impeding land use for developments of this type seem to be in vogue. Proposed project, on the other hand, does not occupy intensive agricul-

tural lands, which seems to be the most urgent regard in California. In the future, it may become imperative for everyone to migrate to the "hills" to relieve the pressures being placed on agriculture and the world's food supply by urban sprawl.

III-F. ANY IRREVERSIBLE ENVIRONMENTAL CHANGES WHICH WOULD BE INVOLVED IN THE PROPOSED ACTION SHOULD IT BE IMPLEMENTED

Several impacts mentioned in this report are irreversible once the cause is initiated. Without the cause, there is no environmental effect. Some proposed changes to the environment are prominent examples of causes which will promote effects of an irreversible nature. Also, discreet secondary impacts, such as commuter energy usage and air pollution, will commit many environmental aspects which are not recoverable with today's technology.

Proposed land use commitments at the onset of the specific plan may perpetrate similar uses by future generations. Should the specific plan be adopted, the land within the plan area will have designated uses that must, when proposed project development occurs, be followed in accordance with regulations spelled out in the plan. Improvements that could occur, such as development of water systems, paving of roads, grading pads for structures, and construction of ponds and drainage channels, will irreversibly alter the existing environmental pattern of Kern River Park region.

Development in the plan area will curtail soil permeability, thereby increasing runoff, thereby possibly transporting sediment from erosion downstream to Lake Ming and Kern River if careful attention is not given to controls set forth by the specific plan. Development will dislocate some wildlife presently inhabiting the area and possibly cause an increase in some types of animal life. The same holds true for vegetation. The result will shift the balance of nature, which would affect the environmental capabilities of the entire area.

Numerous materials and resources used in construction and during the life of proposed project will be consumed. Some long-term impacts resulting from proposed leapfrog development will be greater than coterminous urban development due to commuters and transportation of supplies and services.

Removal of 150 acres of open space will be an irreversible modification of regime.

III-G. THE GROWTH-INDUCING IMPACT OF THE PROPOSED ACTION

It is anticipated that adoption of the specific plan will not encourage haphazard growth and development outside and adjacent to the project boundaries. However, the proposed action may have some, but not significant, growth-inducing impact. Proposed project will foster economic and population growth within specific plan area in a more organized, controlled scheme with a conscious effort on the part of man to mitigate impacts induced upon a fragile environment.

With or without a specific plan, moderate development throughout the area may create a "bedroom community" for Bakersfield and possibly the Arvin-Edison agricultural region. Major consequences of development in the area will be impacts upon transportation-related facilities and resources.

Project should foster economic growth of jobs, taxes, recreation, and sports.

Project may create a need for commercial services, such as a neighborhood shopping center. The creation of commercial land uses has not been considered essential for Rio Bravo Specific Plan. However, if residential growth of the Kern River Park area continues, the presence of a shopping center could reduce miles driven per resident and thereby alleviate impacts related to transportation.

SECTION IV. DOCUMENTS, ORGANIZATIONS, AND PERSONS CONSULTED

A. Documents Consulted

1. Rationale for Design of a Subsurface Wastewater Disposal System to Serve Phase I of Rio Bravo Condominiums, J. T. Winneberger, PhD

2. The Kern River-Olcese Water District, Scott Soule & Associates, March 29, 1974

3. Engineering Geology of the Proposed Rio Bravo Tennis Ranch, Harry R. Feder, December 31, 1973

4. Soils Report & Foundation Investigation on Rio Bravo Tennis Ranch Site, July 14, 1972, Soils Engineering, Inc.

5. Ambient Noise Level Report - Kern County Health Department

6. Water Supply Permit No. 527, dated 6-18-74, Olcese Water District - Issued by Health Department

7. Waste Discharge Requirements, Rio Bravo Tennis Ranch, California Regional Water Quality Control Board, Central Valley Region.

8. The Biotic Environment of the Rio Bravo Site, George E. Lawrence, PhD, January 8, 1974

9. California Air Quality Data, January, February, March, 1974, California Air Resources Board

10. Annual Report, Bakersfield City School District, 1973-74

11. Flood Plain Information - Kern River - Bakersfield, California, Corps of Engineers, October, 1969

12. History of Kern County California, Volume 1, by Thelma B. Miller, 1929

B. Organizations Consulted

1. Kern County Health Department*
2. Kern County Fire Department
3. Kern County Sheriff's Department
4. Kern County Parks and Recreation Department*
5. Kern County Road Commissioner

---

* Reviewed Preliminary Draft EIR

B. Organizations Consulted (continued)

6. Kern County Administrative Office
7. Kern County Assessor's Office
8. Kern High School District
9. Bakersfield City School District
10. National Weather Service
11. Kern River Golf Course*
12. California Regional Water Quality Control Board*
13. Kern County Water Agency
14. California State College, Bakersfield
15. California Air Resources Board
16. Kern County Public Works Department*
17. Pacific Gas and Electric Company
18. Pacific Telephone and Telegraph Company

C. Persons Consulted

1. George E. Lawrence, PhD
2. Scott Soule & Associates
3. Harry R. Feder, Engineering Geologist
4. John T. Winneberger, PhD
5. Soils Engineering, Inc.
6. Robert A. Schiffman, Archaeological Consultant

D. Organizations and Persons Commenting on DEIR

1. Kern County Museum - Richard Bailey: Response dated July 21, 1975
2. Rickett, Ward & Delmarter - Charles Karoly: August 6, 1975
3. Department of Army, Corps of Engineers - Lewis Whitney: August 19, 1975
4. State of California, Office of Planning and Research - William Kirkham: August 29, 1975
    State Water Resources Control Board
    State Air Resources Control Board
5. Kern County Public Works Department: September 2, 1975
6. Kern County Health Department - Vernon S. Reichard: September 9, 1975

SECTION V. WATER QUALITY ASPECTS

Both the Kern County Health Department and the Regional Water Quality Control Board have jurisdiction for the proposed project. Approval of the method of sewage disposal and water supply by the Kern County Health Department will be required prior to an approval of the development. Compliance with the Health Department's standards and the requirements of the Regional Water Quality Control Board should minimize the impacts of the proposed method of sewage disposal and water supply for the proposal. Additional information on the water quality aspects is included within Sections II and III of this report.

RESPONSES AND LEAD AGENCY COMMENTS

Office Memorandum · KERN COUNTY

TO : Jack L. Dalton
Planning Commission

DATE: July 21, 1975

FROM : Richard C. Bailey Richard C. Bailey
Museum Director

SUBJECT: DRAFT ENVIRONMENTAL IMPACT REPORT

Admin
File

I have examined the Draft Environmental Report for:

Rio Bravo Specific Plan

In consideration of Mr. Schiffman's comments from an archeological standpoint I see no reason why this project should not proceed. Also, from historical consideration there seems to be no reason to believe that this project would be injurious to any significant landmark or sites.

KERN COUNTY
'75 JUL 22 AM 9:58
PLANNING COMMISSION

96-5005

TELEPHONE
(805) 327-1486

2901 H STREET
BAKERSFIELD, CALIFORNIA 93301

RICKETT, WARD & DELMARTER
CIVIL ENGINEERS
SURVEYORS
2901 H STREET BAKERSFIELD, CALIFORNIA 327-1486

'75 AUG 29 PM

PLANNING
COMMISSION August 6, 1975

File #9933

Current

Graphics

Assign

File

Kern County Planning Commission
1103 Golden State Highway
Bakersfield, Ca. 93301

Attention: Mr. Fred Simon

Subject: COMMENTS TO DRAFT ENVIRONMENTAL IMPACT REPORT - Rio Bravo Ranch Specific Plan.

Gentlemen:

We submit the following comments to the above referenced DEIR.

Page 7, Section i, Energy

Comment: There would be no gas consumption in an all-electric development. The electric consumption would be 1.4 million KWHRS per year for 280 residential units.

Page 12, Geology

Comment: The second paragraph refers to alluvium averaging about 150 feet in thickness. Recent test holes (copy of logs attached) near the northeast corner of the condominium site and near the tennis lodge revealed depths of alluvium of 52 feet and 56 feet respectively. Therefore, depths to alluvium probably average 55 feet. Round Mountain silt was discovered at the base of the alluvium so the Table in the middle of the page should list alluvium as 55 feet and Round Mountain silt as 800 feet. The other thicknesses remain the same.

Page 12, Footnote One

Comment: On the Surface Geology Map, Feder does not show the inferred Round Mountain Fault going through the property because he found no evidence of this fault on the surface. Feder does show this fault as a subsurface fault on Plate 2 - Rio Bravo Tennis Ranch & Vicinity - Structure on First Sands in the Engineering Geology Report, page 145a of the Appendix.

Concerning Structure, Feder says (underlines are ours): "The principal fault in the area located 1,500 feet west of the property is the northeasterly striking Tarabino (Barker Ranch) fault having a displacement of 450 feet down on the east on the top of the first sands. The north-northwesterly striking Round Mountain fault system with a displacement of 400 feet down on the

east at Round Mountain oil field may continue southerly to the east of the property where displacement may be about 100 feet on the top of the first sands. Other faulting is probably present at depth within and in the vicinity of the property as indicated by contours which may only be partially the result of an irregular top of the Nozu-Olcese."

"Surface Geology - Detailed surface mapping was done in about five square miles for this report. The Tarabino fault is located north of the Kern River in surface exposures of Olcese sand in fault contact with Round Mountain silt. South, minor displacement is mapped in poor exposures of the Mon Bluff formation. The Round Mountain fault similarly displaces Olcese and Round Mountain silt north of the River and appears to displace the Mon Bluff formation, about 50 feet."

"Faulting does not appear to affect either terraces or the alluvium of the Kern River."

It is interesting to note that Feder shows the Tarabino fault through the Kern River Valley into the formation south of the Alfred Harrell Highway and the Kern County Seismic Atlas does not.

Page 12, Footnote 3, &
Page 13, Footnote 1

Comment: There is confusion in the DEIR about which fault Feder is talking about. Footnote 3, Page 12 and Footnote 1, Page 13 refer to Feder's discussion on the Tarabino (Barker Ranch) fault and not the Round Mountain fault. The Tarabino (Barker Ranch) fault is 1/3 to 1/2 mile west of the property. It is not shown on the KCSHA.

Page 15, General Climate

Comment: The DEIR talks about severe wind conditions, which we presume are based on measured data collected at or near the site. The background source for the statements should be given. We question the statements that data collected at Meadows Field does not reflect the true conditions at the site. The project is 10 miles east of Meadows Field. The most eastern extremity of Bakersfield is 9 miles from Meadows Field. Therefore, the project is only 1 mile further from Meadows Field than the furthest point of Bakersfield. If Meadows Field weather is accepted as being representative of Bakersfield, then it is also as representative of the site as it is of some parts of Bakersfield.

Pages 15 & 16, General Climate

Comment: Similarly, the statements concerning rainfall should have the source data referred to. The precipitation contour map in the DEIR shows the mean annual precipitation (M.A.P.) for Bakersfield to be 6 inches and at the project 7 inches, an increase

of 17%. We would expect that statements about "durations of heavy rainfall" and "frequent thunderstorms" are substantiated by rainfall data collected by a recording rain gage or gages. We are familiar with the Tehachapi area and based on records collected by the Tehachapi-Cummings County Water District, the frequency of severe thunderstorms is about once every 10 years. Since Tehachapi is located in the mountains where the severest thunderstorms occur, we would expect thunderstorm frequency at the project site to be less than at Tehachapi and that their severity would also be less. We also base this on the following data contained in the Precipitation-Frequency Atlas of the Western United States, Volume XI-California by the National Weather Service, NOAA, U. S. Department of Commerce, 1973.

		Rainfall in Inches		
Storm Frequency	Duration	Meadows Field	Project Site	Tehachapi
2 yr.	6 hr.	0.8	1.0	1.0
5 yr.	6 hr.	1.0	1.2	1.4
10 yr.	6 hr.	1.2	1.4	1.6
25 yr.	6 hr.	1.4	1.6	1.8
50 yr.	6 hr.	1.5	1.8	2.3
100 yr.	6 hr.	1.6	2.0	2.3
2 yr.	24 hr.	1.4	1.6	1.6
5 yr.	24 hr.	1.8	2.0	2.0
10 yr.	24 hr.	1.8	2.0	2.5
25 yr.	24 hr.	2.0	2.5	3.0
50 yr.	24 hr.	2.5	3.0	3.5
100 yr.	24 hr.	3.0	3.5	4.0
2 yr.*	1 hr.	0.36	0.42	0.42
100 yr.*	1 hr.	0.58	0.79	0.90

*Calculated by methods on Page 16 of said Atlas.

The 2 yr. 6 hr. rainfall at the site is 25% greater than at Meadows, the 2 yr. 1 hr. is 17% greater. The increase of the average of all intensities at the site over Meadows is 19%, and Tehachapi over Meadows is 35%. (The values for Tehachapi are shown as a comparison between Meadows, the site and the mountains.)

The Atlas also shows that areas of heaviest precipitation rates coincide with the highest mountain (termed the orographic effect). This does not agree with the statement in the DEIR that storms tracking easterly are "compacted" against the mountains to the east, thereby creating durations of heavy rainfall over the site. The Atlas shows that the rainfall data and information at Meadows Field is applicable to the site and that the rainfall at the site is 17% to 19% greater than at Meadows. Also the site is only one mile further east than the most easterly portion of Bakersfield and has 7 inches annual rainfall which is only 1 inch more than Bakersfield.

Studies by the Tehachapi-Cummings County Water District indicate that rainfall increases proportionately with altitude, with the highest mountains receiving the heaviest rainfall. This is the orographic effect and is caused by the creation of mechanical convection in the storm system due to the "lifting" effect of the mountains. This is also borne out by the Mean Annual Precipitation map following Page 17 in the DEIR.

Pages 19 & 20, Groundwater

Comment: As previously stated herein, test holes have determined an alluvium depth of 55 feet. There has been constructed one test well at the northeast corner of the condominium site. Measurements to date indicate that no groundwater exists at the site.

We have been in close contact with the Water Quality Control Board and the Kern County Health Department and have received approval of the concept of sewage disposal on the site. As the DEIR shows, there is one approved on-site sewage disposal system for the Tennis Club. Water Quality Control Board Order No. 74-224 sets forth waste discharge requirements for said system. (See Page 33a, Appendix) If there were any evidence of groundwater degradation due to on-site sewage disposal, neither the Water Quality Control Board nor the Kern County Health Department would have approved the system.

On August 22, 1975, the Water Quality Control Board approved a waste discharge requirement for another, on-site system for the Tennis Lodge, now under construction. This system is in the process of being built and also has the approval of the Kern County Health Department.

The only known groundwater in the area is obtained from a well on the Kern River Golf Course. This well is reportedly 275 feet deep, although no well log is available. The groundwater from this well is of poor quality. A chemical analysis of a water sample (copy attached) taken from this well on April 27, 1971 indicates total sulfates of 370 ppm, sodium - 293 ppm, nitrites - 0.8 ppm and total solids - 852 ppm. Hornkohl Laboratories stated, "The sulfate content exceeds the desirable limitation for drinking water. The presence of nitrites could indicate bacteria contamination."

The domestic water supply from this well has been chlorinated for the past few years. The Golf Course domestic supply now comes from the Olcese Water District and the well will be used only for irrigation.

In conclusion, there is no evidence of groundwater at the site, the only groundwater in the area is of poor quality and, therefore, the statement in the DEIR that "groundwater degradation due to sewage disposal on site may be speculated" is no longer valid.

Page 59, Climate & Surface Hydrology

Comment: The runoff calculations in the Appendix are based on a volume of runoff which is 95% of the rainfall. In this calculation, no value was given to the infiltration capacity of the soil (it was assumed the soils to be saturated). We believe that a maximum storm occurring on a saturated watershed in a semi-arid climate (7" average annual rainfall) is an extremely unlikely event. In addition, the calculation on Page 213a of DEIR Appendix seems to imply that all of this water goes to Lake Ming when only a portion of the property drains to Lake Ming.

Our original calculation of 10 acre-feet (12,330 cubic meters) of runoff from a 100-year storm was based on 1.71" (4.34 CM) of rainfall for a 50-year, 24-hour storm (7" M.A.P.) and 38% runoff.

$$\text{Runoff} = \frac{1.71''}{12} \times 190 \times .38 = 10.3 \text{ a.f.}$$

Of this, approximately 60% goes to Lake Ming and 40% to the Kern River.

Page 60, Groundwater

Comment: This section should be modified to reflect the subsurface information reported hereinbefore. Leachate will not percolate to groundwater, but it will percolate into the surface alluvial layer. The sewage flow value should be corrected to 72,000 gallons per day (80 AF per year) based on water consumption figures given on Page 6 of the DEIR exclusive of Irrigation, Lakes & Waterways & Swimming Pools.

Page 70, Public Services & Utilities

Comment: Due to subsurface information hereinbefore reported, it is unlikely for sewage effluent to reach Lake Ming or the Kern River. In a report dated May 19, 1975, Dr. Winneberger reported on the Effect of Development on Water Quality of Kern River (copy of report attached). This report was done before the discovery of much shallower alluvium and the absence of groundwater in the alluvium. However, since it hasn't been absolutely proven that waste waters won't reach the Kern River, we will assume Dr. Winneberger's analysis is still valid. He calculated for the worst case (Peak Waste Flow, Low River Flow and an unlikely discharge directly to the River): Total Dissolved Solids added to the Kern River of 1.7 mg/l and Total Nitrogen added of 0.3 mg/l. His concluding thoughts were, "Even at record low flows, the Kern River would have much more water than the development of Rio Bravo would provide in waste flows." (Peak waste flow of 9.5×10^5 liters per day vs. Kern River 60-year 1-day low flow of 1.8×10^8 liters per day or 0.4 CFS vs. 73.6 CFS) "Therefore, worst-case analyses of highly unlikely concurrences of events show

that the chemical qualities of Kern River waters would likely be affected only to very slight extents. Probably, it would not even be feasible to measure worst-case additions of chemicals to the Kern River over background levels."

We believe the same analysis would apply to Lake Ming and the entrophication rate of the Lake or the incidence of communicable diseases would not be affected by the project.

Very truly yours,

RICKETT, WARD & DELMARTER

Charles Karoly

Charles Karoly

ck:lmn
attach.

cc: Art Richards
Kern Co. Health Dept.

Dr. J. T. Winneberger

Ken Ramsey
Rio Bravo

Rio Bravo Tennis Ranch
Effluent - Alluvium Test Hole E-1

Location: 170'W & 5'N of NW Corner Tennis Club Property.

Elevation: 599' ground.

Total Depth 72'

History: Spud and drilled 7-7/8" hole to 72'. Took ditch samples @ 5' intervals on 6-23-75. Ran 4" P.V.C. pipe & landed @ 72': bottom 20' blank, 20' 1/8" slots, 35' blank 3' above surface. Gravel packed to 1½' below surface and placed 2 sx concrete mix at surface. Jetted mud from hole using air & water until no mud to surface. Hole took water at the rate of 6.6 g.p.m. indicating slots are open. Jetted hole dry. Placed cap on well. Completed on 6-25-75.

Points: Base of alluvium (coarse sand) and top of Round Mountain silt @ 52' (+547').

Ditch sample description:

Depth	
5'	Surface soil, ocher, clayey.
10'	Sand, as in 20' sample, but 50%, medium-grained.
15'	Sand, as in 20' sample.
20'	Sand 90%, coarse to medium grained. Mud 10%.
25'	Sand 90%, very coarse to medium grained, angular to subrounded, 10% mud.
30'	Sand & boulders, very coarse, boulder frags. Mud 10%.
35'	Sand, lt. gry, coarse 50%, medium 30%, fine 10%, mud 10%.
40'	Sand, light, gray, quartzose, coarse 35%, medium 35%, fine 30%. Mud 5%.
45'	Sand, as @ 40'.
50'	Sand 90%, med. gray, coarse, angular to subrounded, quartzose. Mud 10%.
55'	Siltstone 25%, yellowish, soft, mud 50%, fine sand 25%.
60'	Siltstone 50%, med. gray, soft, mud 40%, fine sand 10%.

Harry R. Feder
Engr. Geologist
6-30-75

Rio Bravo Tennis Ranch
Effluent - Alluvium Test Hole E-2

Location: 82'W & 12'N of SW Corner Building A, Tennis Lodge.

Elevation: 598' ground.

Total Depth 65'

History: 6-25-75 spudded & drilled 7-7/8" hole to 76'. Took ditch samples at 5' intervals. Hole filled with mud to 20'. Set 4 sx concrete mix plug and filled to surface with surface soil.

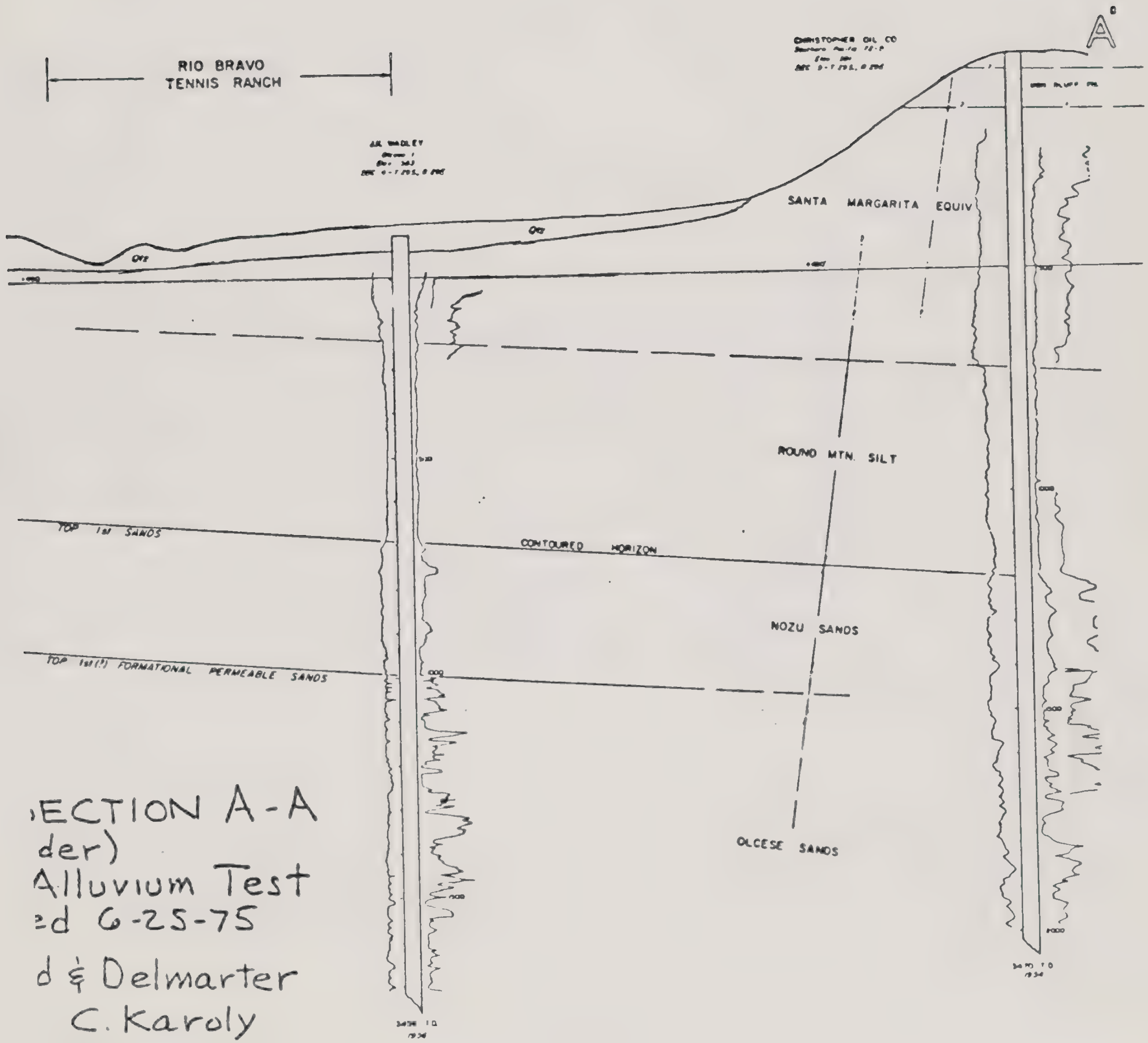
Points: Base of alluvium & top of Round Mountain silt @ 56' (+542')

Ditch sample description:

Depth	
5'	Silt, very fine sand.
10'	Silt, very fine sand.
15'	Silt, very fine sand.
20'	Sand, lt. gray, angular to subrounded, coarse 50%, quartzose medium 25%, fine 20%, mud 5%.
25'	Sand as @ 20'. Occasional pebble-sized fragments.
30'	Sand as @ 20'.
35'	Sand, as @ 20'.
40'	Sand, as @ 20'. Coarse 40%, pebbles 10%.
45'	Pebbly sand. Very coarse pebbles & pebble-sized fragments.
50'	Pebbly sand as @ 45'.
55'	Pebbly sand as @ 45'.
60'	Siltstone, med. gray, soft.
65'	Siltstone, med. gray, soft.

Harry R. Feder
Engineering Geologist
6-30-75

ALLUVIUM TEST HOLES
DRILLED 6-25-75
RIO BRAVO DEVELOPMENT
RICKETT, WARD & DELMARTER
Note: Hole E-1 Cased with 4" PVC, Slotted & Packed



ECTION A-A
der)
Alluvium Test
ed 6-25-75
d & Delmarter
C. Karoly
8-27-75
9933

TELEPHONE (805) 327-3507

HORNKOHL LABORATORIES, Inc.

CHEMICAL AND TESTING ENGINEERS

714 TRUXTUN AVENUE

BAKERSFIELD, CALIFORNIA 93302

May 4, 1971

Laboratory No. 208706

Marked Kern River Golf Course at the pump

Sample Water

Purchase Order No. 14985

Received April 27, 1971

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC HEALTH
APPROVED WATER LABORATORY

Submitted by Kern County Park & Recreation Dept
1415 Truxtun Avenue
Bakersfield, California 93301

* * * * * * *

DOMESTIC WATER ANALYSIS

Constituents:		Parts per Million	Grains per Gallon	Classification
Carbonates, CO_3	--	20.4	1.19	Good
Bicarbonates, HCO_3	--	196.4	11.49	Good
Chlorides, Cl	--	61.0	3.57	Good
Sulfates, SO_4	--	369.6	21.61	High
Sulfides, S	--	0.0	0.00	Good
Ammonia, NH_3	--	Trace	Trace	Good
Nitrites, NO_2	--	0.8	0.05	Suspicious
Nitrates, NO_3	--	Trace	Trace	Good
Calcium, Ca	--	5.6	0.33	Good
Magnesium, Mg	--	3.7	0.22	Good
Sodium, Na	--	293.0	17.13	Fair
Iron, Fe (total)	--	0.1	0.01	Good
Iron, Fe (dissolved)	--	---	---	---
Fluorides, F	--	0.34	0.02	Good
Manganese, Mn	--	0.00	0.00	Good
Potassium, K	--	16.35	0.96	Good
Hardness as $CaCO_3$	--	29.0	1.70	Good
Total Solids @ 105°C.	--	851.5	49.80	~~Fair~~ High
Arsenic, As	--	-0.01	0.00	Good

pH-Value @ 25°C.	-	8.7	Good
Conductivity: Mhos/cm. x 10^5 @ 25°C.	-	125.0	High

Color : Water White
Odor : None
Turbidity : Clear

THEORETICAL ANALYSIS

Calcium Carbonate	--	14.0	0.82
Magnesium Carbonate	--	12.6	0.74
Sodium Carbonate	--	5.3	0.31
Sodium Bicarbonate	--	270.5	15.82
Sodium Sulfate	--	546.9	31.98
Sodium Chloride	--	100.6	5.88

RECEIVED
MAY 6 1971
PARKS & RECREATION DEPT.

Remarks: The sulfate content exceeds the desirable limitation for drinking water. The presence of nitrites could indicate bacteria contamination

Respectfully submitted,
HORNKOHL LABORATORIES, INC.

E. R. Starbuck

E. R. Starbuck, Jr.,
Asst. Chief Chemist

sh

JOHN TIMOTHY WINNEBERGER, PH.D.
Consultant, Septic-Tank Systems
1018 Hearst Avenue, Berkeley, California 94710
Telephone (415) 549-1355

'75 AUG 29 PM 1:35

	Admin	
	Advance	
	Ag Pres	
	Current	
	Zoning	
	Graphics	
	Clerical	
	Assign	
	File	

19 May 1975

PLANNING COMMISSION

Mr. Charles Karoly
Rickett, Ward & Delmarter
2901 H Street
Bakersfield, California 93301

Re: Rio Bravo Condominiums Development

Dear Mr. Karoly,

On 14 April 1975, a meeting was held in offices of the Kern County Health Department, Division of Environmental Health. Attendees from the Division of Environmental Health were: Vernon S. Reichard, R.S., Director of Environmental Health Division; and, Arthur J. Richards, R.S. Attendees from staff of the Water Quality Control Board, Central Valley Region, were: Loren Harlow, P.E., Water Quality Control Engineer; and, Lester S. Obata, Water Quality Control Technician. The developers attending were Messrs. George Nickel and Ken Ramsey. The attending engineer and his consultant for Rio Bravo Condominiums were respectfully: Mr. Charles Karoly of Rickett, Ward & Delmarter, Engineers and Surveyors; and J. T. Winneberger, Ph.D., Consultant, Septic-Tank Systems.

During discussions, several questions were left to be answered by written considerations. Some thoughts are offered herein.

AFFECT OF DEVELOPMENT ON WATER QUALITY OF KERN RIVER

DATA

Kern River Gaging Station Location

Lot 35°38'21", long 118°29'02", in SW¼ NW¼ sec.30, T.26 S., R.33 E., Kern County, temperature recorder at gaging station on right bank 200 ft. downstream from Isabella Dam, and 1.6 miles southwest

of town of Lake Isabella.

Kern River Drainage Area

Drainage area consists of 2,074 square miles.

Kern River Flows

During the period 1894 through 1954, the highest 1-day discharge of the Kern River was 15,500 CFS in 1914; and the highest annual discharge was a mean daily flow of 2,660 CFS in 1916. During that same period, the lowest 1-day discharge was 73.60 CFS (about 47.6 x 10^6 gallons per day, or about 1.8 x 10^8 liters per day) in 1932; and the lowest annual discharge was a mean daily flow of 304.00 CFS (about 2 x 10^8 gallons per day, or about 7.4 x 10^8 liters per day) in 1925.

Waste Waters

Peak day flows have been estimated to be 0.25 mgd (or about 9.5 x 10^5 liters per day), and average flows are estimated at 0.13 mgd. Using peak flows in following thoughts is unrealistically conservative.

Waste water characteristics have been estimated to be: 5-day BOD = 200 ppm; total solids = 500 ppm; dissolved solids = 200 ppm; chlorides = 100 ppm; and, total nitrogen = 50 ppm. (From Mr. Charles Karoly to Mr. Fred Simon of the Kern County Planning Commission, letter dated 14 March 1975.)

In addition to above estimates, the following data are also provided: Na^+ = 66 mg/l; K^+ = 10 mg/l; Ca^{++} = 18; Mg^{++} = 6 mg/l; Cl^- = 74 mg/l; NO_3 - N = 10 mg/l; SO_4^{--} = 28 mg/l; PO_4^{--} = 25 mg/l; Hardness as $CaCO_3$ = 79 mg/l; and TDS = 320 mg/l. These data are average use increments, water supply to secondary sewage, from H. H. Neal, "Advanced Waste Treatment by Distillation", AWTR-7, U.S.P.H.S. Rept., 999-WP-9, 1964.

CALCULATIONS

TDS Added To Kern River In Worst-Case Analyses

Case 1 -- Concurrence of a Peak Waste Flow, a Low River Flow, and an Unlikely Discharge Directly into the River.

Assumptions:

1. Peak-day waste water flow is 9.5×10^5 liters per day, which discharges directly into the Kern River.
2. TDS are 320 mg/l in waste waters.
3. The Kern River during the peak day happens to be at about a 60-year low of only 1.8×10^8 liters on that day.

Calculate:

$$\frac{9.5 \times 10^5\,\ell}{\text{day}} \times \frac{320\text{ mg TDS}}{\ell} \div \frac{1.8 \times 10^8\,\ell}{\text{day}} \simeq 1.7\text{ mg}/\ell\text{ TDS}^*$$

Case 2 -- Concurrence of Peak Waste Flows all Year, a Low Annual Mean Daily Flow, and an Unlikely Discharge Directly into the River all year.

Assumptions:

1. Peak-day waste flows occur all year long at 9.5×10^5 liters per day, which are discharged directly into the Kern River all year.
2. TDS are 320 mg/l in waste waters.
3. The Kern River has a 60-year low annual daily mean flow of 7.4×10^8 liters per day (as in 1925).

Calculate:

$$\frac{9.5 \times 10^5\,\ell}{\text{day}} \times \frac{320\text{ mg TDS}}{\ell} \div \frac{7.4 \times 10^8\,\ell}{\text{day}} \simeq 0.41\text{ mg}/\ell\text{ TDS}^*$$

***Standard Methods for the Examination of Water, Sewage & Industrial Wastes*. 13 Ed. New York: Am. Pub. Health Assoc., Inc. 1971.
This volume describes quantities as low as worst-case estimates at about the outer limits of sensitivity. The estimated values are low indeed, and more realistic estimates would definitely be beyond customary analyses.

Total Nitrogen Added to Kern River In Worst-Case Analyses

Case 1 -- Concurrence of a Peak Waste Flow, a Low River Flow, and an Unlikely Discharge Directly into the River.

Assumptions:

1. Peak-day waste water flow is 9.5×10^5 liters per day, which is discharged directly into the Kern River.
2. Total nitrogen concentrations are 50 mg/l.
3. The Kern River during the peak day happens to be at about a daily 60-year low of only 1.8×10^8 liters on that day.

Calculate:

$$\frac{9.5 \times 10^5 \ell}{\text{day}} \times \frac{50 \text{ mg N}}{\ell} \div \frac{1.8 \times 10^8 \ell}{\text{day}} \simeq 0.3 \text{ mg}/\ell \text{ Total Nitrogen}$$

Case 2 -- Concurrence of Peak Waste Flows All Year, a Low Annual Mean Daily Flow, and an Unlikely Discharge Directly into the River all year.

Assumptions:

1. Peak-day waste flows occur all year long at 9.5×10^5 liters per day, which are discharged directly into the Kern River all year.
2. Total nitrogen concentrations are 50 mg/l.
3. The Kern River has a 60-year low annual daily mean flow of 7.4×10^8 liters per day (as in 1925).

Calculate:

$$\frac{9.5 \times 10^5 \ell}{\text{day}} \times \frac{50 \text{ mg N}}{\ell} \div \frac{7.4 \times 10^8 \ell}{\text{day}} \simeq 0.06 \text{ mg}/\ell \text{ Total Nitrogen}$$

CONCLUDING THOUGHTS

Even at record low flows, the Kern River would have much more water than the development of Rio Bravo would provide in waste flows. Therefore, worst-case analyses of highly unlikely concurrences of

events show that the chemical qualities of Kern River waters would likely be affected only to very slight extents. Probably, it would not even be feasible to measure worst-case additions of chemicals to the Kern River over background levels.

DESIGN CONSIDERATIONS OF SUBSURFACE DISPOSAL FIELDS

SERIAL AND PARALLEL DISTRIBUTION

Field Studies

One of the major research efforts of the Federal Housing Administration (F.H.A.) was support of field studies of septic-tank systems. Those monies went to the U.S.P.H.S., Robert A. Taft Sanitary Engineering Center in Cincinnati, Ohio. In studying systems in the field, as they were, investigators found disposal fields were constructed with two kinds of distribution systems. Parallel distribution systems attempted to get effluent evenly to all sectors of a disposal field, while serial distribution systems attempted to get effluent to sectors of a disposal field, each in turn. The distribution box was the usual device for attempted parallel distribution. Some kind of overflow device (sumps at trench ends overflowing one into the other after a trench filled, or perhaps solid pipes jumping over soil berms, etc.) was used to attempt serial distribution.

Having systems in the field provided the opportunity for collection of data, which was statistically handled. In 1958, the U.S.P.H.S. reported to the F.H.A. studies(1) leading to the following conclusions:

1. Distribution boxes can be eliminated from septic tank soil absorption systems in favor of some other method of distribution without inducing increased failure of disposal fields. In fact, evidence indicates that distribution boxes as presently used may be harmful to the system.
2. Data indicate that on level ground, equal distribution is not necessary if the system is designed so that an

overloaded trench can drain back to the other trenches before failure occurs.

3. On sloping ground a method of distribution is needed to prevent excessive build-up of head and failure of any one trench before the capacity of the entire system is utilized. It is doubtful that distribution boxes as presently used give equal distribution. Rather, they probably act as diversion devices sending most of the liquid to part of the system.
4. Before perfecting a device and increasing the control and extent of inspection required to accomplish equal distribution, the desirability of equal distribution over serial distribution should be established.

The above conclusions match Winneberger's experience with distribution boxes. Not only do they divert flows preferentially to different outlet lines, they change preferences for certain lines for others, depending on inlet velocities.

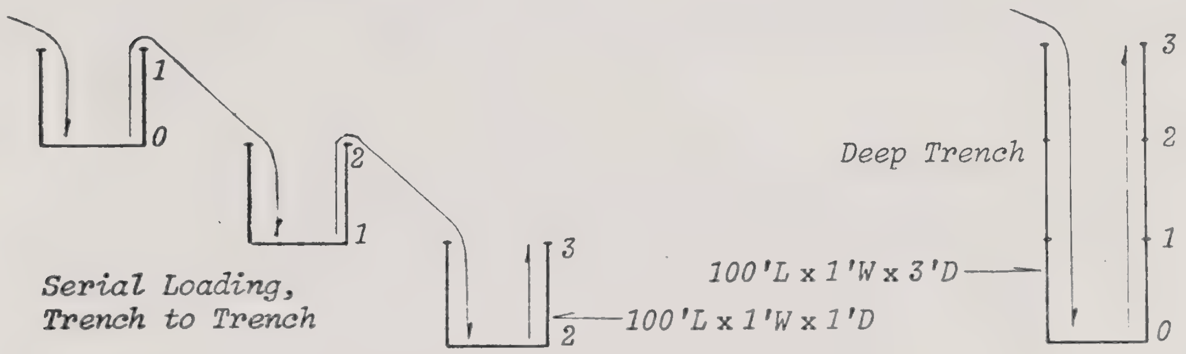
Later, the U.S.P.H.S. reported other studies to the F.H.A. showing that serial distribution was in several respects superior to parallel distribution(2). These studies were published for popular distribution(3). Later, official recognition of findings included changes in the Manual of Septic-Tank Practice(4). The latest edition of the Manual includes serial distribution as an integral part of the document, and distribution boxes have been eliminated(5).

Rationalization

Most persons find serial distribution a less pleasing thought than parallel distribution. The usual query is for the sake of the overloaded first trench. Here, a few miscellaneous remarks in defense of serial distribution are offered. Inasmuch as field data describe serial distribution equal to or superior to parallel distribution, the following remarks are only attempts to offer a selection of rationalizations for what seems to be fact.

As a disposal field ages, ponded effluent clogs sidewalls. Clogging is slight at first in new soil, and more intensive in long-

inundated soil. Thus, a pond fluctuating from daily variations in water use, rises in a disposal field. With serial distribution, a rising pond passes from the top of one trench into the bottom of the next. Ignoring hydraulic head and bottom areas, the drawings below illustrate that sidewalls of serially distributed trenches are loaded from bottom to top, trench to trench, the same as if the sidewalls were in a deep trench, which had been formed by removing bottoms and "stacking" the first three trenches.



Order of Loading: 0 to 1 to 2 to 3

Experimental work conducted at the University of California showed that clogging, at least in initial phases, is within broad limits insensitive to the amounts of soil exposed to septic-tank effluents(7,8). Those data support the belief that serial distribution would be superior to parallel distribution in any case. If an effluent pond in a disposal field rises at rates relatively independent of soil surfaces exposed, it would seem advantageous to force the rising pond by serial distribution to climb the walls of each trench in turn, rather than to climb more rapidly the shorter distance provided by all trenches served together by parallel distribution.

Consider three disposal trenches, each 1-ft. wide, 100-ft. long, and with 1.5-ft. of useable sidewall depth (under the pipe). Altogether, the system offers 300 sq.ft. of bottom areas, and 900 sq.ft. of sidewall areas. Now, an effluent volume equal to one-third of the total holding capacity of the system if spread serially,

will inundate the first trench and leave the companions dry. That would be a wetted bottom area of 100 sq.ft. and wetted sidewall of 300 sq.ft. That same effluent volume spread in parallel would inundate the bottom third of each trench, or wet 300 sq.ft. of bottom areas and 300 sq.ft. of sidewalls. Serial distribution wetted less soil surfaces (until both are full). Also, whereas the serially loaded trench has 1.5-ft. of hydraulic head driving the effluent into lower reaches of soils surfaces, parallel distributed effluents have only 0.5-ft. of hydraulic head driving effluents into lower soil reaches.

In recent years, Professor Rein Laak of the University of Connecticut has asserted in seminars that the biological mat at the effluent-soil interface of a disposal field develops a long-term stabilized absorption rate. Laak has provided data leading to design parameters, based on the stabilized-rate assertion(6). Here, it should be pointed out that Laak's assertion has not been compromised with data provided by other investigators, and more research is needed to explain all data in full. Still, Laak's assertion supports serial distribution as a technique, because parallel distribution on slopes is not achievable and poses unnecessary problems.

Investigators of the U.S.P.H.S., Coulter and Bendixen, remarked, "Many times during the current studies the need has been observed for positive hydraulic control necessary to bring liquid into contact with the soil absorption area, especially on sloping ground." "It has also been observed that this control is not achieved with the distribution box"(3). Coulter and Bendixen go on to say, "With anything less than perfect division of flow in a system of parallel trenches installed at different elevations, one trench is almost certain to be overloaded and eventually becomes surcharged." And, "...surface seepage and local failure will occur before the full capacity of the system can be utilized."

Coulter and Bendixen also have pointed out that effluent passing through serially loaded trenches receives progressive treatment. Thus, "even after a trench has ponded and technically failed, it continues to provide biological treatment of the effluent passing through it"(3).

SORPTION CAPACITY OF SOIL MASS

Historically, formalized engineering of subsurface disposal fields was undertaken by Henry Ryon, Senior Sanitary Engineer, working for New York State in about 1926, and Ryon's directions are still pretty much followed to this day. One might guess that Ryon worked on flatlands, because his efforts were aimed at the question "how big to make it", and he seems to have entirely overlooked the need to have the effluent get away from the injection area (disposal field). That is to say, Ryon concerned himself with the injection system, the trenches and pits, and overlooked the assimilation system, the environment beyond. This unfortunate failure to recognize the anatomy of a subsurface disposal field has led people dealing with the devices to wander almost without rational direction among the different anatomical parts of systems; witness lack of understanding of cohesive relationships among what is now separately discussed -- evapotranspiration, effects of sloping land, depth of soil needed under a disposal field, and the like.

Doubtless, failure to recognize the importance of the assimilation system has led to misdesigns of individual systems. Being a backyard affair, no one knows how extensive misdesigns are, and there is little scientific effort spent on such deficiencies. With the advent of authoritative pressures towards land disposal of waste waters, engineers will be forced to consider among other things, subsurface systems. The first efforts will doubtless be rather large systems and the need for consideration of the assimilation system will ultimately be realized. Meanwhile, technology is still underdeveloped and first attempts must attempt to rationalize experience with technical knowledge from related fields.

In efforts to evaluate the sorptive capacity of the soils of the Rio Bravo Development, three approaches will be made. They cannot answer questions in full, but they should provide rational bases for what must ultimately require experienced subjective judgments.

SORPTIVE CAPACITY OF SOILS WITH ONE PIT INSTALLED

A single pit installed in a homogeneous soil could be considered, if reasonable assumptions could be made. Soils are never homegenous, but they must be assumed so when dealing with geometrical arithmetic.

Flow patterns of pits could be expected to be about what they are known to be like in experimental situations. It is known that flow from cylindrical holes in a porous medium forms a bullet-shaped pattern with the cylinder being imbedded in the nose of the bullet, standing upright on its blunt end(9). Although it would be impossible for percolation to maintain a 45-degree angle away from a cylinder axis, it might be adequate to assume that here.

Feder reports, "The alluvium along the Kern River is water-saturated below river level"(10). Karoly remarked, "The depth to groundwater is estimated at 100 feet below the ground surface at the project." "This is based on the geologic cross-section A-A"(11,12).

Assume

1. A cylindrical pit 40-ft. deep and with other dimensions insignificant to estimates herein.
2. Groundwaters are 100-ft. deep.
3. Soils available for sorption are shaped in a cone, 100-ft. in altitude, and with a 100-ft. radius at the base.
4. Soil porosity is 0.4.

Calculate

Volume of a cone = $\frac{\pi}{3} r^2h$

$\frac{\pi}{3} \times (100\text{ ft.})^2 \times 100\text{ ft.} \times 0.4 \times \frac{7.481\text{ gal.}}{\text{ft.}^3}$

Sorption capacity $\simeq 3.1 \times 10^6$ gallons

Conclusions

Given the assumptions, one pit would have soils capable of sorbing 3,000,000 gallons of waters. At a peak daily flow of 0.25 mgd, saturation of the assumed soil mass would require 12.5 days. The more realistic average daily flow of 0.13 mgd would require 24 days to saturate the soil mass.

SORPTIVE CAPACITY OF PITS IN LINE

Phase I of Rio Bravo Condominiums is contemplated to be served by a disposal field, consisting of 54 pits, spaced 12-ft. apart at edges (13,14). Ignoring a few inches, the pits could be considered 14-ft. apart on centers. In continuing with foregoing rationalizations, the pits could be considered in a line, 756-ft. long. The cone of sorptive soil assumed before, is now split along its central axis and separated by a prism 100-ft. in altitude, 200-ft. in its base, and 756-ft. long. Pertinent assumptions of the prior consideration of one pit would apply here, and they will not be again discussed.

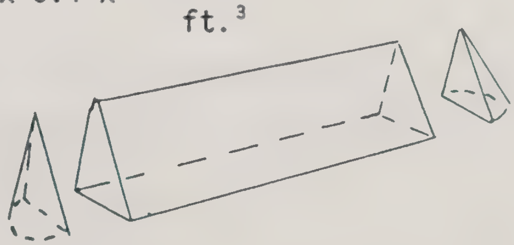
Calculate

Sorption capacity of 2 half cones at ends of the line of pits is 3.1×10^6 gallons (from before).

Prism sorption capacity is:

$\frac{1}{2} \times 100\text{ ft.} \times 200\text{ ft.} \times 756\text{ ft.} \times 0.4 \times \frac{7.481\text{ gal.}}{\text{ft.}^3} \simeq$

2.3×10^7 gallons.



Total sorptive capacity:

$3.1 \times 10^6 + 2.3 \times 10^7 \simeq 2.6 \times 10^7$ gallons

Conclusions

Given the assumptions, a line of pits to serve Phase I of Rio Bravo Condominiums would have soils capable of sorbing 2.6×10^7 gallons of waters. An average flow from Phase I has been conservatively estimated at 16.800 gpd (14) which the assumed soil mass would sorb in about 4.2 years.

SORPTIVE CAPACITY OF RIO BRAVO SOIL MASS

When looking at maps of the Rio Bravo Development (12,15), it might be assumed that the soil mass would be more than a wedge 1,200-ft. wide, 100-ft. thick at the development and tailing out to the sharp edge at the Kern River, and traversing about 2,600-ft. Assuming that wedge of soil was available for sorption of waste waters, together with pertinent assumptions made before, permits an estimate of the sorptive capacity of the soil mass. This assumes also that direction of flow would be toward the Kern River.

Calculate

Volume of wedge:

$\frac{1}{2} \times 100 \text{ ft.} \times 2{,}600 \text{ ft.} \times 1{,}200 \text{ ft.} \simeq 1.56 \times 10^8 \text{ ft.}^3$

Sorption capacity:

$1.56 \times 10^8 \text{ ft.}^3 \times 0.4 \times \frac{7.481 \text{ gal.}}{\text{ft.}^3} \simeq 4.7 \times 10^8 \text{ gal.}$

Conclusions

Given the assumptions, the soil mass of the Rio Bravo Development would have a sorptive capacity of 4.7×10^8 gallons

of waters. At a peak flow of 0.25 mgd, about 5 years (1,880 days) of peak flows would be required to fill the assumed soil mass. At a more realistic average flow of 0.13 mgd, about 10 years (3,600 days) would be required to charge the assumed soil mass.

PERCOLATION OF WASTE WATERS

Prior considerations of what might be static situations will, of course, not be found. After all, waters will not be disposed to the soils until sorptive capacity is realized. Rather, subsurface percolation will carry waters away, and the question is, "Can the soils conduct waters away from the injection area?"

The direction of flow of ground waters, the velocity of flow, the extents of aquifers of whatever permeabilities, the hydraulic driving forces which might be generated upon adding waste waters -- these things are not known. Further, it would not be practical to conduct the great amount of exploratory work which could conceivably answer questions. Here, it seems proper to use D'Arcy's Law (more commonly Darcy's) describing saturated flow through porous media(16) in an effort to assess the situation. Inasmuch as the largest unknown would be the coefficient of permeability, k (soil permeability), assumptions will be made for estimates of other values in D'Arcy's Law.

ASSUMPTIONS

1. D'Arcy's Law: $Q = k\,i\,A$; where Q = volume of flow through a saturated medium, k = coefficient of permeability, i = hydraulic gradient (or height of drop divided by distance traversed), and A = cross-sectional area of whatever the regular geometry of the conduit might be (or supposed to be).
2. Flow takes place between a strip of land 1,200-ft. wide and 2,600-ft. long. This would have flow passing ultimately to the Kern River in the shortest distance. Flows to other areas are assumed not to occur.

3. As flow begins, the upper phreatic surface rises to form a wedge. When hydraulic head is adequate to drive input to the river, flow then takes place in a wafer of soil lying over a static wedge (unlikely) such that A = (1,200-ft. wide by 20-ft. thick) = $24{,}000^2$ ft., i = 60-ft. (elevation from current ground water to bottom of pits) divided by 2,600 ft. (approximate distance to be traversed and uses leg of triangle rather than hypotenuse), and Q = 33,000 $ft.^3$ (250,000 gallons) per day.

CALCULATE

$$\frac{33{,}000\ ft.^3}{day} = k \times \frac{60\ ft.}{2{,}600\ ft.} \times 24{,}000\ ft.^2$$

$k \approx 60$ ft./day, or 2.1×10^{-2} cm/sec

CONCLUSIONS

In looking for meaning of $k \approx 2.1 \times 10^{-2}$ cm/sec, authorities describe that value as typical of, "Clean sands, clean sand and gravel mixtures"(17).

PERMANENCY OF SOLUTION

In past years, septic-tank installations have been regarded as temporary, and public sewers have been believed to be a permanent answer. The advent of the "environmental movement" has thrown a strong, negative light on blind belief in sewers and treatment plants. No longer are rivers and streams regarded as natural extensions of our sewerage management schemes. Now, our interest has been forced to turn to land disposal. Along with this interest, the need for permanent subsurface disposal fields is beginning to come into view.

RESPONSIBILITY

The primary reason septic-tank systems have been regarded as temporary installations has been gross mismanagement in past years. Designs were matters of codes, construction practices were haphazard,

and maintenance of an "entire sewage treatment and disposal system" was the job of a homeowner. Only a device as reliable and troublefree as a subsurface disposal field would tolerate such mismanagement.

Rio Bravo Development

The design of the subsurface disposal system contemplated to serve the Rio Bravo Condominiums has been the product of rational thought of the specific situation. Codes are to be followed except where permission for reasonable, practical improvements has been asked of authorities. The Water Quality Control Board, Central Valley Region, has with the Environmental Health Division of the Kern County Health Department, requested a public entity to be responsible for maintenance of the waste water disposal system of the Rio Bravo Development.

It seems practical, and agreeable to assign long-term responsibility for waste-water management to an existing public entity, now responsible for fresh-water supplies. Part of the responsibility has been recommended to be retained by the designer of the system and his consultant. Together, they are to oversee construction. Also, data are to be collected and used to guide plans for future phases of the Rio Bravo Development, as well as to guide the maintenance program (13).

PERMANENCE

The contemplated subsurface disposal field has good prognosis for a successful future. Nothing manmade, however, is everlasting. For that reason, it is pointed out that permanence of satisfactory waste-water disposal practice is here regarded to be a matter of assignment of responsibility rather than faith in a specific device. That responsibility is subdivided among the engineer and his consultant, the public entity to maintain the system, the subdivider in supporting plans, and county and regional authorities responsible for compliance

with pertinent laws.

Respectfully submitted,

John Timothy Winneberger

John Timothy Winneberger, Ph.D.

REFERENCES

1. Coulter, J.B. and T.W. Bendixen. Effectiveness of The Distribution Box. Cincinnati, Ohio: Robt. A. Taft San. Eng. Center, U.S.P.H.S. 19 February 1958.

2. Coulter, J.B. and T.W. Bendixen. A Study of Serial Distribution for Soil Absorption Systems. Cincinnati, Ohio: Robt. A. Taft San. Eng. Center, U.S.P.H.S. 8 April 1959.

3. Coulter, J.B. and T.W. Bendixen. "Serial Distribution of Septic-Tank Effluents". Public Works Magazine. February 1958.

4. Anon. "Addendum to Part I Manual of Septic-Tank Practice." P.H.S. Pub. No. 526. 1 August 1959.

5. Anon. Manual of Septic-Tank Practice. U.S.P.H.S. Pub. No. 526. Washington, D.C.: U.S. Govt. Printing Office. Revised 1967. (See i.e. Fig. 7 on page 19, and Fig. 11 on page 25.)

6. Healy, K.A. and R. Laak. Sanitary Seepage Fields - Site Evaluation and Design. CE 73-61. Storrs, Conn.: School of Engineering, Univ. of Conn. February 1973.

7. Winneberger, J.H., L. Francis, S.A. Klein, and P.H. McGauhey. Biological Aspects of Failure of Septic-Tank Percolation Systems, Final Report. Berkeley, Calif.: San. Eng. Res. Lab., Univ. of Calif. 31 August 1960.

8. Winneberger, J.H., A.B. Menar, and P.H. McGauhey. A Study of Methods of Preventing Failure of Septic-Tank Percolation Fields, Second Annual Report. Berkeley, Calif.: San. Eng. Res. Lab., Univ. of Calif. 22 December 1962.

9. Healy, K.A. and R. Laak. Factors Affecting The Percolation Test. C.E. 72-51. Storrs, Conn.: School of Engineering, Univ. of Conn. April 1972.

10. Feder, H.R. Engineering Geology Rio Bravo Ranch, Tentative East Tract Area, Kern County, California. Bakersfield, Calif. 5 August 1974.

11. Letter to Mr. Fred Simon, Kern County Planning Commission, from Rickett, Ward & Delmarter, dated 14 March 1975.

12. "Rio Bravo Tennis Ranch Section A-A' Profile." A drawing by Redstone, dated 12-11-73, No. 9098, Sh. 2 of 2. Bakersfield, Calif.: Rickett, Reaves & Ward, Civil Engineers.

13. Winneberger, J.T. Rationale for Design of a Subsurface Wastewater Disposal System to Serve Phase I of Rio Bravo Condominiums, Kern County, California. A report to Mr. Wilbur Rickett of Rickett, Ward & Delmarter. Berkeley, Calif. 11 November 1974.

14. Notes from a meeting on 6 February 1975, of Messrs. Vernon Reichard, Arthur Richards, James Buntin, William Thiessen, and J. T. Winneberger, held in offices of the Division of Environmental Health of Kern County Health Department.

15. "Rio Bravo Tennis Ranch & Vicinity Site Plan." A drawing by Redstone, dated 12-12-73, No. 9098, Sh. 1, of 2. Bakersfield, Calif.: Rickett, Reaves & Ward, Civil Engineers.

16. Cedergren, H.R. Seepage, Drainage, and Flow Nets. John Wiley & Sons, Inc. 1967.

17. Winneberger, J.T. "Correlation of Three Techniques for Determining Soil Permeability." J. Env. Health 37(2): 108-118. September/October 1974.

Responses to Applicant's Representative's Comment:

Comment:

Page 7, Section i, Energy

Comment: There would be no gas consumption in an all-electric development. The electric consumption would be 1.4 million KWHRS per year for 280 residential units.

Response: EIR text changed to reflect these new facts.

Comment:

Page 12, Geology

Comment: The second paragraph refers to alluvium averaging about 150 feet in thickness. Recent test holes (copy of logs attached) near the northeast corner of the condominium site and near the tennis lodge revealed depths of alluvium of 52 feet and 56 feet respectively. Therefore, depths to alluvium probably average 55 feet. Round Mountain silt was discovered at the base of the alluvium so the Table in the middle of the page should list alluvium as 55 feet and Round Mountain Silt as 800 feet. The other thicknesses remain the same.

Response: EIR text changed to reflect these new facts.

Comment:

Page 12, Footnote One

Comment: On the Surface Geology Map, Feder does not show the inferred Round Mountain Fault going through the property because he found no evidence of this fault on the surface. Feder does show this fault as a subsurface fault on Plate 2 - Rio Bravo Tennis Ranch & Vicinity - Structure on First Sands in the Engineering Geology Report, page 145a of the Appendix.

Page 12, Footnote 3, &

Page 13, Footnote 1

Comment: There is confusion in the DEIR about which fault Feder is talking about. Footnote 3, Page 12 and Footnote 1, Page 13 refer to Feder's discussion on the Tarabino (Barker Ranch) fault and not the Round Mountain fault. The Tarabino (Barker Ranch) fault is 1/3 to ½ mile west of the property. It is not shown on the KCSHA.

Response: A typing error has been corrected in EIR text; footnotes reflect and clarify various aspects of geology discussion.

Comment:

Page 15, General Climate

Comment: The DEIR talks about severe wind conditions, which we presume are based on measured data collected at or near the site. The background source for the statements should be given. We question the statements that data collected at Meadows Field does not reflect the true conditions at the site. The project is 10 miles east of Meadows Field. The most eastern extremity of Bakersfield is 9 miles from Meadows Field. Therefore, the project is only 1 mile further from Meadows Field than the furthest point of Bakersfield. If Meadows Field weather is accepted as being representative of Bakersfield, then it is also as representative of the site as it is of some parts of Bakersfield.

Response: National/Oceanic Atmospheric Administration reports: "Another local characteristic is the occasionally warm, dry, southeast chinook (Foehn) wind that spills through Tehachapi Pass during winter. This wind usually attains velocities of 30 to 40 miles per hour; sometimes reaching as high as 60 miles an hour. Its path is approximately 30 miles wide and the stream flows in a curving course around the south end of the valley, turning northward and rising; it is seldom manifest on the floor of the valley for a distance of more than 50 miles." Also, Berry and Bollary* state.

"Diurnal variations in wind direction are strong where local conditions result in the domination of the winds by such effects as mountain and valley breezes."

Actually, most routine meteorological measurements are made in such a way that small eddies are eliminated. Most anemometers and thermometers do not react to small, high-frequency changes. Observations are so widely spaced, both in time and area, that most must be considered averages over horizontal distances of tens of kilometers and vertical distances of tens of meters. Even such relatively large circulation phenomena as thunderstorms fall through the "mesh" of the usual weather-station network.

Tehachapi foehn winds discussed in Rio Bravo EIR are, as NOAA explains, short-lived. To dissipate after 50 miles of run means that since proposed site is closer to the originating point (mountains), these winds must have greater speeds at Rio Bravo than at Meadows. The accompanying cross-section may show the reader what is meant. Since Rio Bravo is 10.5 miles closer to Greenhorn and Tehachapi Mountains, it can be inferred that winds, at times, have greater speeds at Rio Bravo.

Off-hand observations made by staff concur with events discussed. Also, foehn winds of "great" magnitude have been observed at Kern River Golf Course. "Phenomenal" drives with the wind have been accomplished.

Pages 15 & 16, General Climate

Comment: Similarly, the statements concerning rainfall should have the source data referred to. The precipitation contour map in the DEIR shows the mean annual precipitation (M.A.P.) for Bakersfield to be 6 inches and at the project 7 inches, an increase of 17%. We would expect that statements about "durations of heavy rainfall" and "frequent thunderstorms" are substantiated by rainfall data collected by a recording rain gauge or gauges. We are familiar with the Tehachapi area and based on records collected by the Tehachapi-Cummings County Water District, the frequency of severe thunderstorms is about once every 10 years. Since Tehachapi is located in the mountains where the severest thunderstorms occur, we would expect thunderstorm frequency at the project site to be less than at Tehachapi and that their severity would also be less. We also base this on the following data contained in the Precipitation-Frequency Atlas of the Western United States, Volume XI - California by the National

*Handbook of Meteorology, McGraw Hill

Weather Service, NOAA, U. S. Department of Commerce, 1973.

Storm Frequency	Duration	Rainfall in Inches: Meadows Field	Project Site	Tehachapi
2 yr.	6 hr.	0.8	1.0	1.0
5 yr.	6 hr.	1.0	1.2	1.4
10 yr.	6 hr.	1.2	1.4	1.6
25 yr.	6 hr.	1.4	1.6	1.8
50 yr.	6 hr.	1.5	1.8	2.3
100 yr.	6 hr.	1.6	2.0	2.3
2 yr.	24 hr.	1.4	1.6	1.6
5 yr.	24 hr	1.8	2.0	2.0
10 yr.	24 hr.	1.8	2.0	2.5
25 yr.	24 hr.	2.0	2.5	3.0
50 yr.	24 hr.	2.5	3.0	3.5
100 yr.	24 hr.	3.0	3.5	4.0
2 yr. *	1 hr.	0.36	0.42	0.42
100 yr. *	1 hr.	0.58	0.79	0.90

*Calculated by methods on Page 16 of said Atlas.

The 2 yr. 6 hr. rainfall at the site is 25% greater than at Meadows, the 2 yr. 1 hr. is 17% greater. The increase of the average of all intensities at the site over Meadows is 19%, and Tehachapi over Meadows is 35%. (The values for Tehachapi are shown as a comparison between Meadows, the site and the mountains.)

The atlas also shows that areas of heaviest precipitation rates coincide with the highest mountain (termed the orographic effect). This does not agree with the statement in the DEIR that storms tracking easterly are "compacted" against the mountains to the east, thereby creating durations of heavy rainfall over the site. The Atlas shows that the rainfall data and information at Meadows Field is applicable to the site and that the rainfall at the site is 17% to 19% greater than at Meadows. Also the site is only one mile further east than the most easterly portion of Bakersfield and has 7 inches annual rainfall which is only 1 inch more than Bakersfield.

Studies by the Tehachapi-Cummings County Water District indicate that rainfall increases proportionately with altitude, with the highest mountains receiving the heaviest rainfall. This is the orographic effect and is caused by the creation of mechanical convection in the storm system due to the "lifting" effect of the mountains. This is also borne out by the Mean Annual Precipitation map following Page 17 in the DEIR.

Response: The distribution of precipitation is probably most noticeably affected by mountains. On both windward and lee slopes, there is an increase of precipitation with elevation. Yet the values observed on equal levels are much higher on the windward than on the lee side. Furthermore, isolated thunderstorm cells can be stalled or redirected by the presence of mountains.

Since Rio Bravo is less than 4 miles from the Kern River fault-block, it is within the "orographic initial lift zone." Within this area, barometric pressure during the lifting process is decreased, which in turn sometimes "triggers" precipitation over the area if condensation elements are present.

Further comment on the comparison of Meadows and Tehachapi data discussed by applicant's representative is called for:

1. A 40-year NOAA record of precipitation for Caliente (elevation 395 meters MSL) reveals a mean annual precipitation of 27.71 cm. Tehachapi (elevation 1218 meters MSL) has a 28-year NOAA recorded mean annual precipitation of 26.16 cm.

2. Using applicant's representative's logic, Tehachapi amounts should be about 3½ times as great as Caliente.

3. Caliente is about 17 miles from Rio Bravo.

4. Methods used for computing "Rainfall in Inches" placing Rio Bravo between Meadows Field and Tehachapi are correct, but due to other (Caliente) data, the logic substantiating these calculations may be in error.

5. Height-balanced Thiessan polygons could be constructed by employing Meadows, Caliente, Arvin-Frick, and Bakersfield 10S data to give a more accurate account of precipitation on site.

6. "Studies by the Tehachapi-Cummings County Water District" failed to consider such data as that of Caliente, thus the erroneous conclusion: "rainfall increases proportionately with altitude."

It is agreed that elevation is one factor which controls precipitation, however, there are numerous factors which must be looked at:

The type of rainfall: frontal or conventional
Precipitation variations: geographical distribution, areal pattern, variations of rainfall in time
Storm patterns, cyclic variations, secular variations, seasonal variations, diurnal variations, and intensity.
Measurement: Type of instrument, instrument environment, and instrument location.

Pages 19 & 20, Groundwater

Comment: As previously stated herein, test holes have determined an alluvium depth of 55 feet. There has been constructed one test well at the northeast corner of the condominium site. Measurements to date indicate that no groundwater exists at the site.

We have been in close contact with the Water Quality Control Board and the Kern County Health Department and have received approval of the concept of sewage disposal on the site. As the DEIR shows, there is one approved on-site sewage disposal system for the Tennis Club. Water Quality Control Board Order No. 74-224 sets forth waste discharge requirements for said system. (See Page 33a, Appendix). If there were any evidence of groundwater degradation due to on-site sewage disposal, neither the Water Quality Control Board nor the Kern County Health Department would have approved the system.

On August 22, 1975, the Water Quality Control Board approved a waste discharge requirement for another, on-site system for the Tennis Lodge, now under construction. This system is in the process of being built and also has the approval of the Kern County Health Department.

The only known groundwater in the area is obtained from a well on the Kern River Golf Course. This well is reportedly 275 feet deep, although no well log is available. The groundwater from this well is of poor quality. A chemical analysis of a water sample (copy attached) taken from this well on April 27, 1971 indicates total sulfates of 370 ppm, sodium - 293 ppm. nitrates - 0.8 ppm and total solids - 852 ppm. Hornkohl Laboratories stated, "The sulfate content exceeds the desirable limitation for drinking water. The presence of nitrites could indicate bacteria contamination."

The domestic water supply from this well has been chlorinated for the past few years. The Golf Course domestic supply now comes from the Olcese Water District and the well will be used only for irrigation.

In conclusion, there is no evidence of groundwater at the site, the only groundwater in the area is of poor quality and, therefore, the statement in the DEIR that "groundwater degradation due to sewage disposal on site may be speculated" is no longer valid.

Response: None required

Comment:
Page 59, Climate & Surface Hydrology

Comment: The runoff calculations in the Appendix are based on a volume of runoff which is 95% of the rainfall. In this calculation, no value was given to the infiltration capacity of the soil (it was assumed the soils to be saturated). We believe that a maximum storm occurring on a saturated watershed in a simi-arid climate (7" average annual rainfall) is an extremely unlikely event. In addition, the calculation on Page 213a of DEIR Appendix seems to imply that all of this water goes to Lake Ming when only a portion of the property drains to Lake Ming.

Our original calculation of 10 acre-feet (12,330 cubic meters) of runoff from a 100-year storm was based on 1.71" (4.34 CM) of rainfall for a 50-year, 24-hour storm (7" M.A.P.) and 38% runoff.

$$\text{Runoff} = \frac{1.71''}{12} \times 190 \times .38 = 10.3 \text{ a.f.}$$

Of this, approximately 60% goes to Lake Ming and 40% to the Kern River.

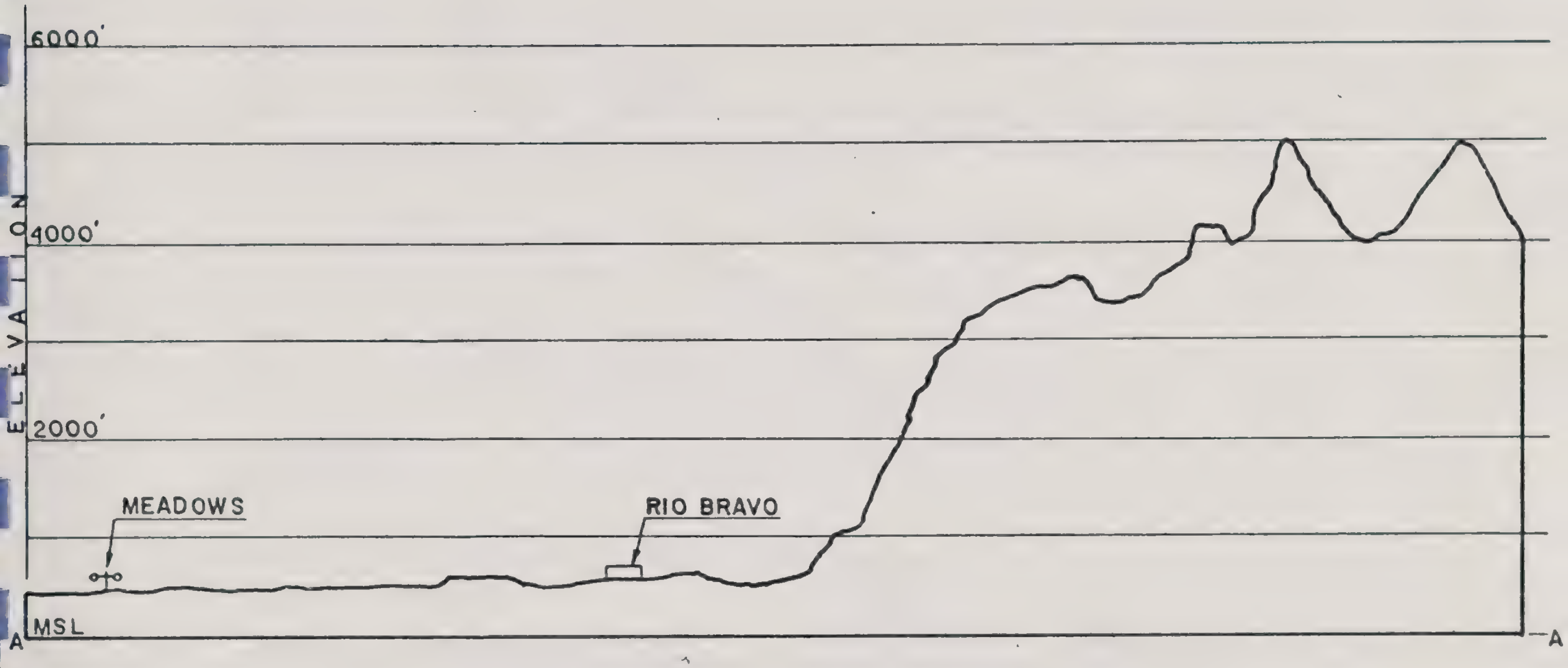
Response: It is not implied that all runoff will go into Lake Ming. The 21% volume of Lake Ming was given for the Layman to compare 17.8 acre-feet

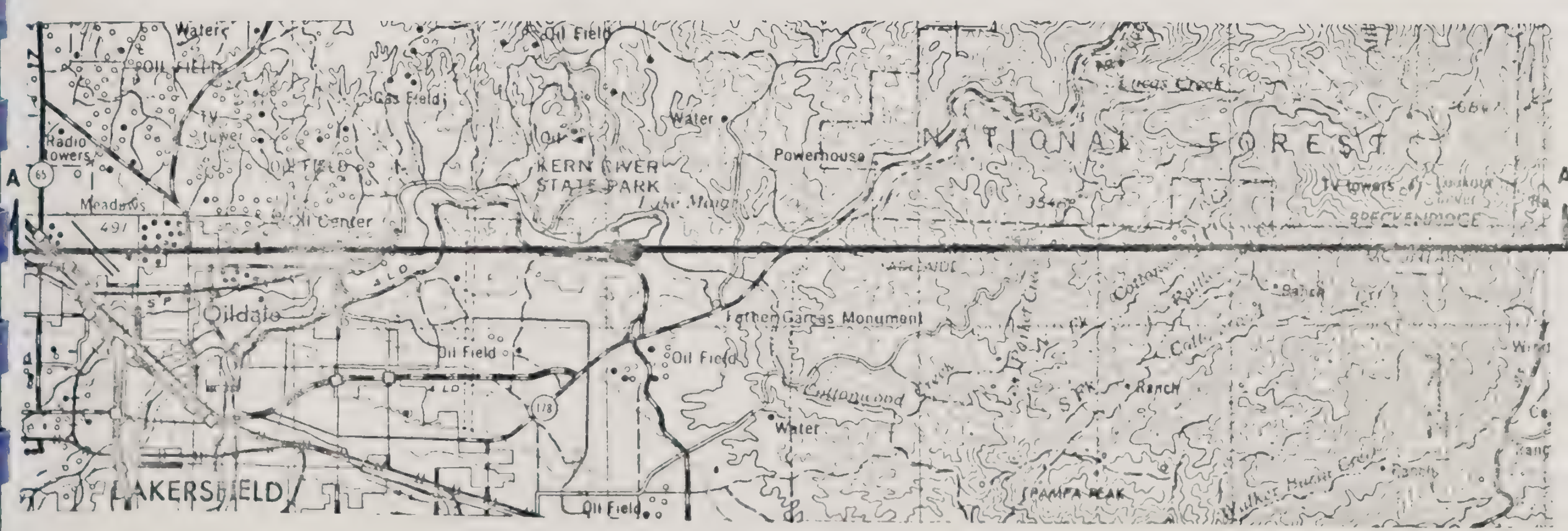
with. Applicant's representative uses .38 runoff factor for proposed project. Also, 1.71" (4.34 C.M.) 50-year, 24-hour storm is used. Staff uses a record 24-hour precipitation of 3.02 cm which is considerably less for proposed project site. Either way of predicting maximum runoff may be correct. On the other hand, both methods may be wrong.

Comment:
Page 60, Groundwater

Comment: This section should be modified to reflect the subsurface information reported hereinbefore. Leachate will not percolate to groundwater, but it will percolate into the surface alluvial layer. The sewage flow value should be corrected to 72,000 gallons per day (80 AF per year) based on water consumption figures given on Page 6 of the DEIR exclusive of Irrigation, Lakes & Waterways & Swimming Pools.

Response: EIR text (page 60) has been altered to reflect this comment.





Scale 1:250,000

5 0 5 10 15 20 Statute Miles

MEADOWS - RIO BRAVO - BRECKENRIDGE TRANSECT

DATE 9·3·75	KERN COUNTY PLANNING COMMISSION	FILE
DRAWN BY KRAUSE	BAKERSFIELD 149 CALIFORNIA	

FROM: See return address on reverse. | DATE 19 Aug 75

WRITER'S NAME/TELEPHONE NO.

D. Salladay (916) 449-3164

[X] YOUR [ ] OUR COMMUNICATION (Kind, reference symbol, date, subject, or other identification)

Letter dated 27 Jun 75 regarding the Draft Environmental Impact Report (EIR)for Rio Bravo Specific Plan

ACTION TAKEN OR REQUESTED

[ ] REPLY WILL BE FURNISHED ON OR ABOUT ______

[X] RECEIPT ACKNOWLEDGED

[ ] REQUEST DATE WHEN REPLY MAY BE EXPECTED

[ ] FOR DIRECT REPLY

[ ] WE HAVE SENT YOUR COMMUNICATION TO (See below)

[ ] TO OBTAIN INFORMATION

We have reviewed the report, and the work as proposed will not conflict with flood control or other programs within our jurisdiction.

[ ] OTHER INFORMATION [ ] SUPPLIED OR [ ] REQUESTED

TYPED NAME, GRADE, AND TITLE

for GEORGE C. WEDDELL

Chief, Engineering Division

SIGNATURE

DA FORM 209, 1 Jan 70 REPLACES EDITION OF 1 NOV 66, WHICH WILL BE USED.

DELAY, REFERRAL, OR FOLLOW-UP NOTICE (AR 340-15)

State of California
GOVERNOR'S OFFICE
OFFICE OF PLANNING AND RESEARCH
1400 TENTH STREET
SACRAMENTO 95814

EDMUND G. BROWN JR.
GOVERNOR

	Admin	
	Advance	
	Ag Pres	
✓	Current	95
	Zoning	
	Graphics	
	Clerical	
	Assign	
	File	

August 29, 1975

Mr. Fred Simon
Kern County Planning Commission
1103 Golden State Avenue
Bakersfield, CA 93301

SUBJECT: SCH #75071583 - Specific Plan for Rio Bravo Ranch

Dear Mr. Simon:

This is to certify that State review of your federal grant application and/or environmental impact report is complete.

The results of the State review are attached. You should respond to the comments as required by Office of Management and Budget Circular A-95 and/or the California Environmental Quality Act.

Sincerely,

William G. Kirkham

William G. Kirkham
Management Systems Officer
State Clearinghouse

WGK/mcd
Attachments

cc: Mary Schell, State Library
Lanier C. Greer, KCG
Robert H. Lewis, SWRCB
William C. Lockett, ARB
Louis A. Beck, SWRCB

KERN COUNTY
'75 SEP 4 PM 2:19
PLANNING COMMISSION

Memorandum

o : Mr. L. Frank Goodson
Projects Coordinator
The Resources Agency
Resources Building, 13th Floor

Date :

rom : **STATE WATER RESOURCES CONTROL BOARD**

ubject: COMMENTS ON NOTICE OF INTENT, SCH 75071583

Specific Plan for Rio Bravo Ranch

The attached comments from the California Regional Water Quality Control Board constitute the comments of the State Water Resources Control Board.

for M E Holland
ROBERT H. LEWIS, Chief
Division of Planning and Research

Attachment

-7 (1/75)

REGIONAL WATER QUALITY CONTROL BOARD

INTERNAL MEMO

TO: State Water Resources Control Board
Division of Planning and Research
Attention: Robert H. Lewis

FROM: Calif. Regional Water Quality Control Bd.
Central Valley Region - Fresno

DATE: 1 August 1975

SIGNATURE: L A Beck
Louis A. Beck, Engineer-in-Charge

SUBJECT: Notice of Intent SCH 75071583
Specific Plan for Rio Bravo Ranch

We have reviewed the Draft Environmental Impact Statement for the Rio Bravo Ranch Specific Plan.

Waste discharge requirements were adopted on 22 March 1974 by Order No. 74-222 for Rio Bravo Ranch. This order regulates the discharge from the existing Tennis Club, lodge and restaurant. This order does not include the proposed condominium or residential subdivision.

The Rio Bravo Development Company has submitted a Report of Waste Discharge for the stage 1 condominium development. The waste disposal system design was unique in that numerous small diameter seepage pits were to be used for waste disposal. Waste discharge requirement for stage 1 will be considered for adoption by the Regional Board in August 1975.

The waste disposal system design for stages 2 and 3 will be based upon an evaluation of the operation and system performance of stage 1.

The developer will be required to file an application for waste discharge requirements prior to commencement of stages 2 and 3.

Thank you for the opportunity to review the Draft Environmental Impact Report for the Rio Bravo Ranch Specific Plan. If you have any questions, please feel free to contact us.

PLANNING COMMISSION

'75 SEP 4 PM 2:19

CB 326A(4/75)

TGS | L.Q.H.

emorandum

: Honorable Ronald Robie, Director
Department of Water Resources
1416 Ninth Street
Sacramento, CA 95814

Attention: Mr. Ken Fellows

Date : August 13, 1975

Subject: Specific Plan for
Rio Bravo Ranch -
Bakersfield
Kern County
SCH. No. 75071583

m : Air Resources Board RAB for
William C. Lockett, Chief
Evaluation and Planning

The proposed project consists of a 200-unit condominium development and an 80-lot single-family residential subdivision. The project would be located approximately six miles northeast of Bakersfield and serve ultimately 920 people.

The environmental impact report (EIR) adequately addresses itself to the number of vehicle miles traveled (VMT) associated with the development (41,000 daily and 16,826,500 yearly). The EIR needs to calculate the corresponding emissions (hydrocarbons, carbon monoxide, oxides of nitrogen) resulting from this increased VMT.

Although the impact of these additional vehicles' emissions may not seem to be significant when compared to the area-wide emissions, the decision makers need to know the project site is included in an air quality maintenance area (AQMA) for photochemical oxidant and carbon monoxide. An AQMA is defined as an area with the potential for exceeding any national ambient air quality standard in the period 1975 to 1985. The decision makers need to recognize the potential adverse impact this project and similar projects in the same area may have on existing air quality. "The cumulative effect of a residential development in an area similar to the site could have an adverse effect, especially during periods of inversion" (page 96). Careful consideration needs to be given to all future residential developments located in AQMAs.

KERN COUNTY
'75 SEP 4 PM 2:19
PLANNING
COMMISSION

State Air Resources Board - August 13, 1975

Comment: The environmental impact report (EIR) adequately addresses itself to the number of vehicle miles traveled (VMT) associated with the development (41,000 daily and 16,862,500 yearly). The EIR needs to calculate the corresponding emissions (hydrocarbons, carbon monoxide, oxides of nitrogen) resulting from this increased VMT.

Response: Since the State Air Resources Board has not included the presently accepted values for its concerns, it is not possible to give a specific value for possible vehicle emissions. However, the Kern County Health Department has supplied emissions factors for the area of Rio Bravo and Kern County. For this information, see memorandum dated September 16, 1975, page 171.

Office Memorandum • **KERN COUNTY**

TO :	Planning Department EIR Department	**DATE:**	September 2, 1975
FROM :	Public Works Department EIR Section		
SUBJECT:	Draft EIR - Rio Bravo Ranch		

PLANNING COMMISSION

'75 SEP 3 AM 7:57

We have reviewed the Draft EIR for the Rio Bravo Ranch Specific Plan, and we have no comments. However, our staff Engineering Geologist does have the attached additional comments to those submitted May 23, 1975.

TK/sl
Attachment

96-5004

Office Memorandum • KERN COUNTY

TO : Environmental Section

DATE: August 28, 1975

L. Timberlake

FROM : L. Timberlake, Engineering Geologist

SUBJECT: Draft Environmental Impact Report
Rio Bravo Ranch Specific Plan

'75 AUG 29 PM

PUBLIC WORKS & SURVEYOR

ROUTE

SIG.

SOLID WASTE

FILE

'75 SEP 3 AM 7:57

KERN COUNTY PLANNING COMMISSION

To supplement my memorandum of May 23, 1975, I would like to point out that the engineering geology report was written for an Environmental Impact Report and may not be adequate for development of the project. Extensive grading will be required during construction.

Items in Section IV of the enclosed Guidelines for Engineering Geologic Reports should be considered during development.

6-5005

CONTENT OF GEOLOGICAL REPORTS

The purpose of this statement is to provide geologists who submit reports to the Department of Public Works, County of Kern, with an understanding of what kinds of information, discussion, and recommendations are desired or required in order that such reports can be accepted. It is recognized that certain geologic interpretations cannot be firm or complete, at least in advance of grading operations, but it is expected that all kinds of pertinent data will be presented fully and clearly, so that interpretations and recommendations can be critically reviewed by others. It also is recognized that different physical situations demand reports differing from one another in scope, length, and organization; most of the following comments are therefore intended to serve as a general guide and check list for those persons who prepare and use geological reports, rather than as a rigid framework of requirements.

I. GEOLOGICAL MAPPING

A. Each report must be a product of independent geologic mapping of the subject area at an appropriate scale and in sufficient detail to yield a maximum return of pertinent data. To obtain this objective, it may be necessary for the geologist to extend his mapping into adjacent areas.

B. All mapping should be done on a base with satisfactory horizontal and vertical control -- in general a detailed topographic map. The nature and source of the base map should be specifically indicated.

C. Mapping by the geologist should reflect careful attention to the lithology, structural elements, and three-dimensional distribution of the earth materials exposed or inferred within the area. In most hillside areas these materials will include <u>both</u> bedrock and surficial deposits. A clear distinction should be made between observed and inferred features and relationships.

D. A geologic map should accompany the report if the geologic aspects cannot be presented adequately in the text. A detailed large-scale map normally will be required for a report on a tract, as well as for a report on a smaller area in which the geologic relationships are not simple.

E. Whenever necessary geologic or structure sections should be used to describe three-dimensional relationships.

F. The locations of test holes and other specific sources of subsurface information should be indicated in the text of the report or, better, on the map and any sections that are submitted with the report.

II. GENERAL INFORMATION

Each report should include definite statements concerning the following matters:

A. Location and size of subject area, and its general setting with respect to major geographic and geologic features.

B. Who did the geologic mapping upon which the report is based, and when the mapping was done including time spent in field work.

C. Any other kinds of investigations made by the geologist and, where pertinent, reasons for doing such work.

D. Topography and drainage in the subject area.

E. Abundance, distribution, and general nature of exposures of earth materials within the area.

F. Nature and source of available subsurface information. Suitable explanations should provide any technical reviewer with the means for assessing the probable reliability of such data. (Subsurface relationships can be variously determined or inferred, for example, by projection of surface features from adjacent areas, by the use of test-hole logs, and by interpretation of geophysical data, and it is evident that different sources of such information can differ markedly from one another in degree of detail and reliability according to the method used.)

III. GEOLOGIC DESCRIPTIONS

The report should contain brief but adequate descriptions of all natural materials and structural features recognized or inferred within the subject area. Where interpretations are added to the recording of direct observations, the bases for such interpretations should be clearly stated.

The following check list may be useful as a general, though not necessarily complete, guide for descriptions:

A. Bedrock -- igneous, sedimentary, metamorphic types.

1. Identification as to rock type (e.g.; granite, silty sandstone, mica schist).

2. Relative age, and, where possible, correlation with named formations (e.g.; Tulare formation, Bena gravels).

3. Distribution.

4. Dimension features (e.g. thickness, outcrop breadth, vertical extent).

5. Physical characteristics (e.g.; color, grain size, nature of stratification, foliation, or schistosity, hardness, coherence).

6. Special physical or chemical features (e.g.; calcareous or siliceous cement, concretions, mineral deposits, alteration other than weathering).

7. Distribution and extent of weathered zones; significant differences between fresh and weathered rock.

8. Response to natural surface and near-surface processes (e.g.; raveling, gullying, mass movement).

B. Structural features -- stratification, foliation, schistosity, folds, zones of contortion or crushing, joints, shear zones, faults, etc.

1. Occurrence and distribution.

2. Dimensional characteristics.

3. Orientation, and shifts in orientation.

4. Relative ages (where pertinent).

5. Special effects upon the bedrock.

6. Specific features of faults (e.g.; zones of gouge and breccia, nature of offsets, timing of movements); are faults active in either the geological sense or the historical sense?

C. Surficial (unconsolidated) deposits - - artificial (manmade) fill, topsoil, stream-laid alluvium, beach sands and gravels, residual debris, lake and pond sediments, swamp accumulations, dune sands, marine and nonmarine terrace deposits, talus accumulations, creep and slopewash materials, various kinds of slump and slide debris, etc.

1. Distribution, occurrence, and relative age; relationships with present topography.

2. Identification of materials as to general type.

3. Dimensional characteristics (e.g.; thickness, variations in thickness, shape).

4. Surface expression and correlation with features such as terraces, dunes, undrained depressions, anomalous protuberances.

5. Physical or chemical features (e.g.; moisture content, mineral deposits, content of expansible clay minerals, alteration, cracks and fissures, fractures).

6. Physical characteristics (e.g.; color, grain size, hardness, compactness, coherence, cementation).

7. Distribution and extent of weathered zones; significant differences between fresh and weathered material.

8. Response to natural surface and near-surface processes (e.g.; raveling, gullying, subsidence, creep, slope-washing, slumping and sliding).

D. Drainage -- surface water and groundwater.

1. Distribution and occurrence (e.g.; streams, ponds, swamps, springs, seeps, subsurface basins).

2. Relations to topography.

3. Relations to geologic features (e.g.; pervious strata, fractures, faults).

4. Sources and permanence.

5. Variations in amounts of water (e.g.; intermittent springs and seeps, floods).

6. Evidence for earlier occurrence of water at localities now dry (e.g.; vegetation, mineral deposits, historic records).

7. The effect of water on the properties of the in-place materials.

E. Features of special significance (if not already included in foregoing descriptions).

1. Features representing accelerated erosion (e.g.; cliff re-entrants, badlands, advancing gully heads).

2. Features indicating subsidence or settlement (e.g.; fissures; scarplets, offset reference features, historic records and measurements).

3. Features indicating creep (e.g.; fissures, scarplets, distintive patterns of cracks and/or vegetation, topographic bulges, displaced or tilted reference features, historic records and measurements).

4. Slump and slide masses in bedrock and/or surficial deposits: distribution, geometric characteristics, correlation with topographic and geologic features, age and rates of movement.

5. Deposits related to recent floods (e.g.; talus aprons, debris ridges, canyon-bottom trash).

6. Active faults and their recent effects upon topography and drainage.

IV. THE BEARING OF GEOLOGIC FACTORS UPON THE INTENDED LAND USE

Treatment of this general topic, whether presented as a separate section or integrated in some manner with the geologic descriptions, normally constitutes the principal contribution of the report. It involves both (1) the effects of geologic features upon the proposed grading, construction, and land use, and (2) the effects of these proposed modifications upon future geological processes in the area.

The following check list includes the topics that ordinarily should be considered in submitting discussion, conclusions, and recommendations in the geologic report:

A. General compatibility of natural features with proposed land use:

Is it basically reasonable to develop the subject area?

1. Topography.

2. General bearing characteristics of earth materials.

3. Lateral stability of earth materials.

4. Problems of flood inundation, erosion, and deposition.

5. Problems caused by features or conditions in adjacent properties.

6. Other general problems.

B. Proposed cuts.

1. Prediction of what materials and structural features will be encountered.

2. Prediction of stability.

3. Problems of excavation (e.g.; unusually hard or massive rock, excessive flow of groundwater).

4. Recommendations for reorientation or repositioning of cuts, reduction of cut slopes, development of compound cut slopes, special stripping above daylight lines, buttressing, protection against erosion, handling of seepage water, setbacks for structures above cuts, etc.

C. Proposed masses of fill.

1. General evaluation of planning with respect to canyon-filling and sidehill masses of fill.

2. Suitability of existing natural materials for fill placed under engineering control.

3. Recommendations for positioning of fill masses, reduction in fill slopes, special preparation of ground to be loaded with fill, provision for underdrainage, buttressing, special protection against erosion, setbacks for structures near edges of fill prisms, etc.

D. Recommendations for subsurface testing and exploration.

1. Cuts and test holes needed for additional geologic information.

2. Program of subsurface exploration and testing, based upon geologic considerations, that is most likely to provide data needed by the soils engineer.

E. Special recommendations:

1. Areas to be left as natural ground.

2. Removal or buttressing of existing slide masses.

3. Flood protection.

4. Protection from wave erosion along shorelines.

5. Problems of groundwater circulation.

6. Position of structures with respect to active faults.

V. SEISMICITY

The California Division of Mines and Geology Notes No. 37 should be used as a format for writing the seismic section.

VI. SPECIAL GEOLOGIC REPORT

Sometimes special reports are required which are directed toward a special problem. An example is the report submitted to comply with the Alquist-Priolo Geologic Hazards Zone Act.

This type of report should be brief and only cover the geologic aspect that is in question.

A slope stability recommendation could possibly be covered in a one page letter report.

VIII. SUPPLEMENTAL REPORTS

When an additional investigation or study is needed a supplemental report may be required. This would be in support of an earlier comprehensive report. Special stability or foundation problems may become apparent during the initial study. The supplemental report may be submitted at a later date when requested and could be in the form of a letter report.

KERN COUNTY HEALTH DEPARTMENT

1700 Flower Street
P. O. Box 997
Bakersfield, California-93302

OWEN A. KEARNS, M.D., M.P.H.
Director of Public Health
Air Pollution Control Officer

September 9, 1975

Kern County Planning Commission
1103 Golden State Avenue
Bakersfield, California 93301

RE: Rio Bravo Specific Plan, Draft Environmental Impact Report

Gentlemen:

The Health Department and Air Pollution Control District have completed their review of the subject document, and submit the attached environmental analyses for your review. Thank you for the opportunity to participate in the preparation of this document.

Very truly yours,

Owen A. Kearns, M.D., Health Officer
Air Pollution Control Officer

V S Reichard
Vernon S. Reichard, Director
Environmental Health Division

VSR:BT:df
enclosures

RIO BRAVO SPECIFIC PLAN,
DRAFT ENVIRONMENTAL IMPACT REPORT
ENVIRONMENTAL ANALYSIS
KERN COUNTY HEALTH DEPARTMENT
ENVIRONMENTAL HEALTH DIVISION
LAND DEVELOPMENT SECTION
September 9, 1975

The Land Development Section staff have reviewed the subject DEIR and offer the following comments and recommendations:

Community Noise:

Because of the possibility of controversy regarding future residents' exposure to noise generated by racing boats, it is our opinion that noise-related information contained in the DEIR and its appendix should be carefully considered during preparation of the Rio Bravo Specific Plan. With that purpose in mind, the following suggestions are made concerning the DEIR:

Page 67: Some discussion of the significance of racing boat-generated noise should be included here. Portions of our memorandum dated March 20, 1975 would be appropriate for inclusion or reference. In addition, reference should be made to the principles embodied in the County Noise Element to illustrate possible public reaction to the racing noise, and to illustrate the fact that the County has guidelines in this respect.

Page 87: The reference to the California state law establishing noise insulation standards for multiple-occupancy dwellings implies that all residential construction will be affected by this law. It should be noted that these state laws apply only to multiple-occupancy dwellings. The County Noise Element provides standards for all residential noise environments; it would be useful to refer to those standards in this section of the DEIR.

Page 96: Again, the Specific Plan for the Rio Bravo Tennis Ranch should weigh the possible reaction of future residents to racing boat noise. A reference to the Noise Element and our memorandum of March 20, 1975 should be included in this section of the DEIR, along with a discussion of the anticipated reactions of future residents.

Page 102: Under Alternative C. it is stated that the heavy use of landscaping may be used to reduce noise levels. It should not be implied that landscaping is a satisfactory device for noise reduction, as the literature reveals that at least 100 feet of dense forest is required to reduce noise levels by 6-7 decibels (dbA). Thus landscaping of the sort and extent generally practiced in this area is of no significance in reducing noise levels. Also, it should be pointed out that earthen berms are not the only type of sound barrier available. Block walls and other types of barriers are effective. (See our memorandum dated March 20, 1975, and the County Noise Element for examples.)

Thus the problems of drainage and aesthetics may not be as formidable as implied in the DEIR, and this alternative should not be so readily dismissed. Indeed, the provision of sound barriers would be in accordance with the intent of the Noise Element of the County General Plan.

Sewage Disposal:

The draft EIR, page 3, correctly notes that sewage disposal by septic tank systems has been proposed by the developer for the Rio Bravo Ranch development and that the first of those systems has been constructed and is in use at the tennis club. A second system for the lodge has been approved by the Health Department and will be built in the very near future (incidentally, the Water Quality Control Board's Waste Discharge Order No. 74-224 for the tennis club system, which is mentioned on page 3 of your text and included in the appendix, was rescinded by Water Quality on 8/22/75 and replaced with Waste Discharge Order No. 75-194, embracing both the club and lodge systems).

On 2/6/75 and 4/14/75 the Health Department asked the developer and/or his technical consultants for further studies, findings, and reports regarding feasibility of the use of septic tank systems -- as opposed to a sewage treatment plant, and from the engineering, public health, and water quality protection viewpoints -- for the remainder of the development. Subsequently written communications, dated 2/19/75, 2/25/75, 3/5/75, 3/14/75, 6/18/75, and 6/29/75, were received from Dr. Winneberger and Mr. Karoly. However, some pertinent findings in some of these communications were based upon the assumption that the alluvial host for septic tank system effluent was approximately 150 feet thick (see the report, "Engineering Geology, Proposed Rio Bravo Tennis Ranch, Kern County, California, December 31, 1973") and that the water table might be found at a depth of perhaps 100 feet. Subsequent test drilling during the latter part of June 1975, though, disclosed that the base of the alluvium and top of the Round Mountain Silt was instead at 52 to 56 feet below the ground surface (in the two test holes drilled). This disclosure, we feel, will negate at least some of the earlier findings related to the feasibility of using septic tank systems, and we have therefore requested an additional report from the developer (personal communication to Mr. Karoly, 8/26/75). Pending receipt and appraisal of the results of the requested studies and conclusions, the Health Department is unable to accept the proposal to use septic tank systems for the subdivision and condominium complex.

In the meantime, we do have these comments regarding sewage disposal and that portion of the DEIR related to it:

1. Page 6 of the DEIR, "Water Consumption": since water consumption within a residence is directly related to the flow of waste water from it and since the quantity of waste water, in turn, determines the size of the residence's septic tank system, we have asked that

a figure of 100 gpcpd domestic water consumption (and, therefore, waste water flow) be used for purposes of sizing septic tank systems for the condominiums. We are of the opinion that a condominium dweller will use no less domestic water than the inhabitant of a single family residential structure. You are correct in citing Dr. Winneberger for the 67 gpcpd figure used on your page 6 (Winneberger's report of 11/11/74, DEIR appendix page 69a), but his subsequent letter of 2/8/75 (DEIR appendix page 88a) alludes to the 100 gpcpd suggested by the Health Department.

2. Page 12 of the DEIR: in these excerpts from the engineering geology report, two references to alluvium approximately 150 feet deep are made. It now appears (see above) that the alluvium is more like 50 or 55 feet deep.

3. Page 19 of the DEIR, "Groundwater": this section may require change in view of the revised thickness of alluvium. On the positive side -- it is our understanding that the two test holes drilled during the last part of June 1975 were dry (one of them was cased to serve as an observation hole, so the validity of "our understanding" might be ascertained by sounding the hole for water). If the alluvium contains no unconfined or perched ground water, the water table beneath the site would then probably be below the Round Mountain Silt (which has been assigned a thickness of 700 feet by the engineering geologist) and the water in that confined zone would be of questionable quality. Therefore, the possibility of contaminating it with septic tank effluent would be made more remote.

4. Page 21 of the DEIR, "thus, contamination of water supplies can result": this emphasized statement applied to this site may be a little too harsh and unnecessarily damning in view of the newly acquired knowledge on alluvium and ground water (see our Item No. 3 preceding).

5. Page 46 of the DEIR, next to last paragraph: the present proposal is to use seepage pits, not leach lines, with septic tanks. We suggest the wording, "....is by septic tank systems."

6. Page 60 of the DEIR, "Groundwater," first paragraph: see our Item No. 3 preceding. Further studies by the applicant's consultants may show that sewage effluent will not percolate to ground water aquifers. Let's wait and see.

7. Page 70 of the DEIR; last paragraph: (a) again, there has been no proposal to use leach lines with septic tanks; (b) as Dr. Winneberger says in his 2/19/75 report (DEIR appendix p. 50a), "Chances of pathogens reaching the Kern River are remote indeed, and chances of disease transmission by such a route are even more remote." Admittedly, the finality of this statement hinges on the additional studies requested by this department. In the meantime, there is a section in the Kern County Ordinance Code -- as enforced by the Health Department -- which reads as follows:

Section 3404.1. Discharge of Contents or Effluent From Sanitary Facilities Into Waters Prohibited. Notwithstanding any provision in this Chapter or in this Ordinance Code to the contrary, it shall be unlawful for any person, firm or corporation or governmental agency of any kind or nature, to hereinafter establish or install any sanitary facility or sewage disposal system of any kind or nature which is designed to or which does discharge any contents or effluent, whether previously filtered or otherwise treated or not, from any privy, water closet, cesspool or septic tank into any river, stream, canal, lake or other surface body of water, or discharge the same in such near proximity thereto that the same might reasonably be expected to enter such waters by seepage, percolation, drainage or otherwise and in no event within 100 feet of the high water mark of such body of water.

AR:JB:df

RIO BRAVO SPECIFIC PLAN
Kern County Health Department
Environmental Health Division
Air Quality Control Section

August 20, 1975

COMMENTS:

The Mulford-Carrell Air Resources Act of California and the Federal Clean Air Act require that the State of California, through the Air Resources Board (ARB), and the local air pollution control district (APCD), establish programs for the attainment and maintenance of national ambient air quality standards. The United States Environmental Protection Agency (EPA) has established a priority system whereby areas are ranked according to the concentration of air contaminants in the atmosphere that are covered by national standards. For example, an area containing high concentrations of specific contaminant is rated Priority I with respect to that particular contaminant. Kern County has been designated a Priority I area for particulate matter, carbon monoxide, and hydrocarbons (oxidants).

Kern County has a number of real and potential sources of air contaminants which can and do contribute to the problem of air quality control. The objective of the air quality control program is to control the emissions of air contaminants from non-vehicular sources and maintain air quality through land use and transportation planning. The major sources of air contaminants are from solid waste sources, stationary sources, and vehicular sources.

RECOMMENDATIONS:

After review of the draft environmental impact report (EIR), the staff of the air quality control section recommends the following:

1. The DEIR contains estimated VMT (vehicle miles traveled) which will result from the implementation of the proposed project. Calculated emissions resulting from the project must be included in the EIR.

   The United States Environmental Protection Agency (EPA) has published a list of emission factors which may be utilized for the above task. Assumptions which are used for the calculations must also be stated in order to expedite the review process.

   Estimated quantities of air contaminants should be expressed in tons per year and organized in chart form. The chart must include at least estimates for oxides of nitrogen, carbon monoxide, and hydrocarbons.

2. During the construction phase of the proposed project, large quantities of soil may be moved. It is the recommendation of the air quality staff that no more native vegetation should be removed during construction than is necessary. The above action will reduce fugitive dust problems which occur when property is extensively graded.

Office Memorandum • KERN COUNTY

KERN COUNTY

Admin	
Advance	
✓ Current	JS
Planning	
Control	
Rogers	
File	

TO : Loren Rogers
Planning Department

DATE: 9/16/75

'75 SEP 19 PM 1:35

FROM : Larry Landis
KCAPCD

SUBJECT: Emission Factors

PLANNING
COMMISSION

Here are the emission factors for light duty cars and motorcycles for use during 1975. It is our understanding that you will provide these to the author of the Rio Bravo Tennis Ranch Specific Plan for inclusion in the EIR.

	ORGANICS Total	Reactive	CO	NO_x	SO_2	Particulate
Cars	0.0110	0.0091	0.0939	0.0116	0.0004	0.0015
Motorcycles	0.0329	0.0282	0.1059	—	—	—

To obtain tons per day of pollutant, multiply its emission factor times the VMT's per year divided by 1,000,000.

Land Development Section, Kern County Health Department.   September 9, 1975

1. Comment: Page 67: Some discussion of the significance of racing boat-generated noise should be included.

   Response: Page 67 has been corrected to reflect this concern.

2. Comment: Page 87: The reference to the California state law establishing noise insulation standards for multiple-occupancy dwellings implies that all residential construction will be affected by this law.

   Response: Page 87 has been corrected to reflect this concern.

3. Comment: Page 96: A reference to the Noise Element should be included on this page.

   Response: The page has been corrected to reflect this concern.

4. Comment: Page 102: Alternative C should correct a misconception on using landscaping as a noise buffer.

   Response: The correction has been made to page 102.

COMMENTS & RESPONSES - KERN COUNTY HEALTH DEPARTMENT

1. Comment: "We are of the opinion that a condominium dweller will use no less domestic water than the inhabitant of a single-family residential structure."

   Response: EIR text changed to reflect 100 gpcpd demand.

2. Comment: "...engineering geology report, two references to alluvium approximately 150 feet deep are made. It now appears that the alluvium is more like 50 or 55 feet deep."

   Response: EIR text changed to reflect new information about site's stratigraphy.

3. Comment: "This section may require change in view of revised thickness of alluvium."

   Response: Page 19 of EIR text changed to reflect additional information and discussion received.

4. Comment: "Page 21 of DEIR, "thus contamination of water supplies can result": this emphasized statement applied to this site may be a little to harsh and unnecessarily damning in view of the newly acquired knowledge on alluvium and groundwater."

   Response: EIR text changed/altered to reflect new information about site's stratigraphy.

5. Comment: "Page 46 of the DEIR, next to last paragraph: the present proposal is to use seepage pits, not leach lines, with septic tanks. We suggest the wording, ". . . .is by septic tank systems."

   Response: Not all facilities in Lake Ming area employ seepage pits. Sentence on page 46 reworded.

6. Comment: "Page 60 of the DEIR, "Groundwater," first paragraph: see our Item No. 3 preceding. Further studies by the applicant's consultants may show that sewage effluent will not percolate to ground water aquifers. Let's wait and see."

   Response: EIR text changed to reflect recent studies and observations made.

7. Comment: "Admittedly, the finality of this statement hinges on the additional studies requested by this department."

   Response: Specific Plan, when finalized shall reflect the most current information, data, studies, and observations which have relevance to proposed project. Since FEIR is being prepared before "all the cards are on the table,"

applicable ordinance codes are all the control over proposed project that are available. Text of EIR has been changed/altered to reflect concerns of Health Department. Employing the "envelope approach" to water quality control may be detrimental to health and welfare of Kern County residents in the end. If additional studies are required by Health Department, then the results of such studies, if significant results are established, should be made an addendum to this document.

Air Quality Control Section, Environmental Health Division, Kern County Health Department - August 20, 1975

Comment: The DEIR contains estimated VMT (vehicle miles traveled) which will result from the implementation of the proposed project. Calculated emissions resulting from the project must be included in the EIR.

Response: The vehicle emission factors used by the Air Quality Control Section of the Health Department are included in a memorandum dated September 16, 1975, page 171.